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Division of Plant Disease Control

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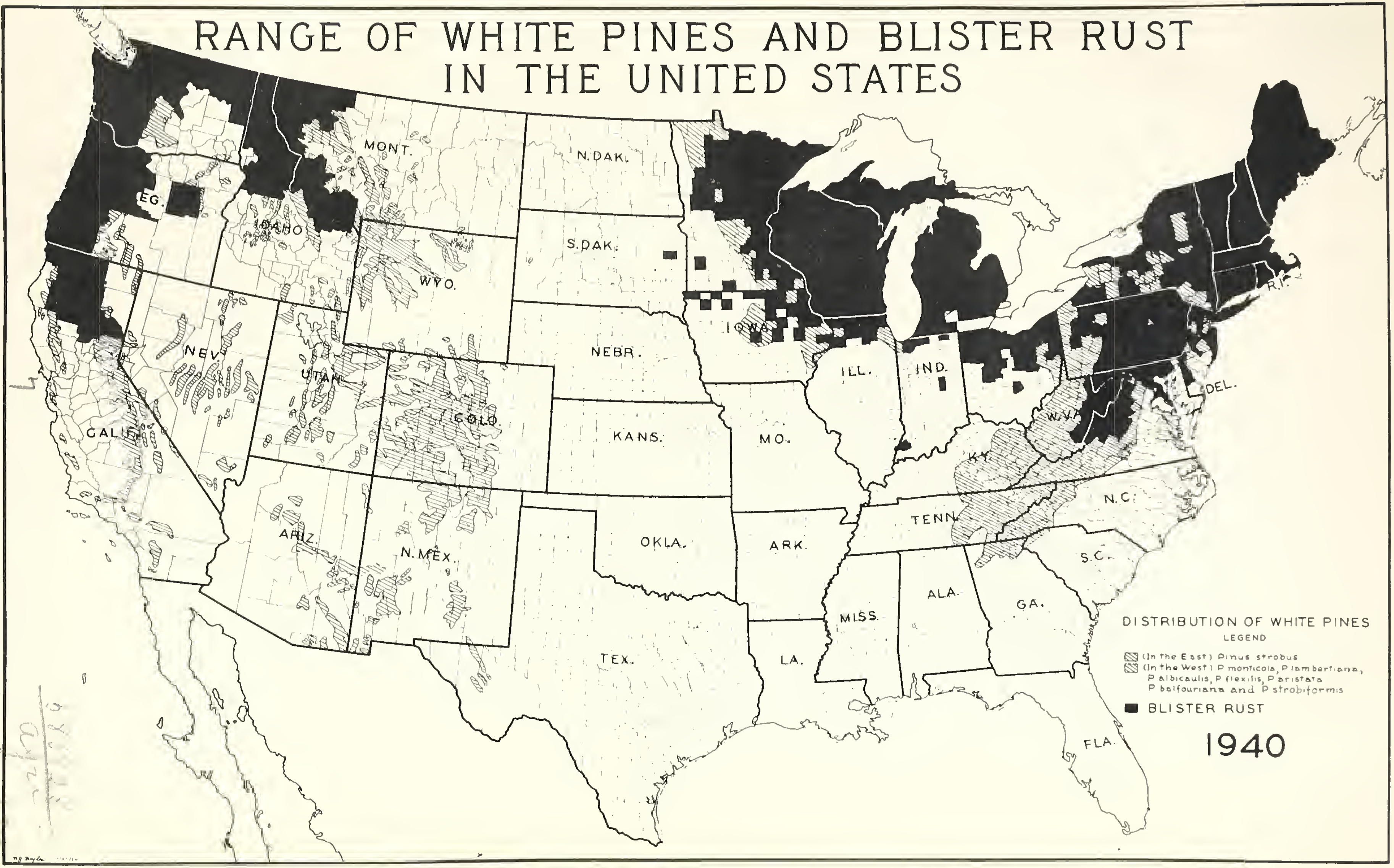
RANGE OF WHITE PINES AND BLISTER RUST IN THE UNITED STATES



U. S. DEPARTMENT OF AGRICULTURE

CONTENTS

WHITE PINE BLISTER RUST CONTROL IN THE NORTHWESTERN REGION

January 1 to December 31, 1940

Herman E. Swanson, Senior Pathologist

****

INTRODUCTION

The following report covers the blister rust control activities in the Northwestern Region for the calendar year 1940, as conducted by the Bureau of Entomology and Plant Quarantine, U. S. Forest Service, National Park Service, and the states of Idaho, Montana, Washington, Colorado and Wyoming. These activities were carried on in the five states in accordance with agreements executed between the Bureau of Entomology and Plant Quarantine and the other agencies in the respective states.

In reporting upon the progress of ribes eradication in the Northwestern Region, data are presented under the following headings:

1. Ribes eradication in the Inland Empire. This represents the commercial white pine area of northern Idaho, northwestern Montana, and northeastern Washington. In addition, there is a separate report for each national forest area and adjacent state and private lands. These individual reports include:

    a. Cabinet and Kootenai operations (Montana).
    b. Clearwater operation (Idaho).
    c. St. Joe operation (Idaho).
    d. Coeur d'Alene operation (Idaho).
    e. Kaniksu operation (Idaho and Washington).
    f. Mount Spokane operation (Idaho and Washington).

2. National Parks

    a. Mount Rainier
    b. Glacier

3. Central Rocky Mountain Region.

    a. Colorado
    b. Wyoming

The 1938 annual report contains the latest summary of ribes eradication work performed in this region, since 1938 was the last year that this work was performed in this territory.

ORGANIZATION AND ADMINISTRATION

The Bureau of Entomology and Plant Quarantine conducted experimental work in methods of ribes eradication, ribes ecology studies, pine disease surveys, and pine damage studies.

The ribes eradication program consisted of the following projects:

	Camps	Workers
Bureau of Entomology and Plant Quarantine:		
ERA (financed by WPA allotments)	13	887
State of Idaho in cooperation with the Bureau of Entomology and Plant Quarantine:		
Regular (financed by state and federal funds)	2	66
CCC (S-camps in Idaho)	2	141
U. S. Forest Service:		
Regular (financed by regular appropriations)	32	1,138
ERA (financed by WPA allotments)	7	379
CCC (F-camps)	15	1,127
National Park Service:		
CCC (Mount Rainier)	3	95
CCC (Glacier)	3	90

Summary:

	Camps	Workers
Regular	34	1,204
ERA	20	1,266
CCC	23	1,453
Total	77	3,923

APPROPRIATIONS - BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

Northwestern Region - Blister Rust Control

Regular Appropriations:

Fiscal year 1940	$59,233.38
Fiscal year 1941 (as of 12/31/40)	72,700.00

WPA Allotments:

Fiscal year 1940:	
Idaho	$305,000.00
Washington	34,000.00
Administrative	7,304.00
Fiscal year 1941 (as of 12/31/40)	
Idaho	$185,910.00
Washington	25,500.00
Administrative	5,100.00

Cooperative Funds:

State of Idaho	$10,035.35 *

*Biennial appropriation by State Legislature for period April 1, 1939 to March 31, 1941 was $28,000.00

EXPENDITURES FOR CALENDAR YEAR 1940

Bureau of Entomology and Plant Quarantine:

	Fiscal Year 1940	Fiscal Year 1941	Total
Regular Funds:			
Idaho	$29,965.52	$23,812.82	$53,778.34
Montana	3,135.10	3,104.29	6,239.39
Washington	3,323.40	5,561.60	8,885.00
Wyoming	-	676.77	676.77
Total	$36,424.02	$33,155.48	$69,579.50
ERA (Project Funds):			
Idaho	$ 98,366.33	$130,732.49	$229,098.82
Washington	15,786.07	15,866.56	31,652.63
Total	$114,152.40	$146,599.05	$260,751.45
ERA (Administrative Funds):			
Idaho	$3,519.00	$1,365.00	$4,884.00
Washington	488.53	189.32	677.85
Total	$4,007.53	$1,554.32	$5,561.85
Cooperative Funds:			
State of Idaho (calendar year 1940)			$10,034.48

Bureau of Entomology and Plant Quarantine (Summary):

State	Regular	ERA	Cooperative	Total
Idaho	$53,778.34	$233,982.82	$10,034.48	$297,795.64
Montana	6,239.39	-	-	6,239.39
Washington	8,885.00	32,330.48	-	41,215.48
Wyoming	676.77	-	-	676.77
Total	$69,579.50	$266,313.30	$10,034.48	$345,927.28

U. S. Forest Service:

State	Regular	ERA	Total
Idaho	$336,918.22	$48,914.39	$385,832.61
Montana	47,727.74	28,807.77	76,535.51
Washington	52,391.43	-	52,391.43
Total	$437,037.39	$77,722.16	$514,759.55

Note: Expenditures from CCC funds not included in this report.

EXPENDITURES BY ALL AGENCIES FOR ALL YEARS

Bureau of Entomology and Plant Quarantine (1922-1940):

Federal Funds:

State	Regular	ERA	NIRA	Total
Idaho	$1,165,160.60	$2,900,763.68	$470,841.62	$4,536,765.90
Montana	191,953.09	196,847.11	88,306.79	477,106.99
Washington	211,869.75	437,039.29	105,199.60	754,108.64
Sub-Total	$1,568,983.44	$3,534,650.08	$664,348.01	$5,767,931.53
Colorado	11,852.04	59,396.51	8,041.45	79,290.00
Wyoming	10,480.59	58,283.96	7,107.41	75,871.96
Sub-Total	$ 22,332.63	$ 117,680.47	$ 15,148.86	$ 155,161.96
Grand Total	$1,591,316.07	$3,652,330.55	$679,496.87	$5,923,143.49

Cooperative Funds (1928-1940):

Idaho	State	$132,148.50
	Private	88,383.63
	Total	$220,532.13

Forest Service (1930-1940):

Forest	State	Regular	ERA	NIRA	Total
Clearwater	Idaho	$ 543,602.59	$ 78,808.87	$ 334,645.93	$ 957,057.39
St. Joe	Idaho	1,014,526.61	6,983.40	376,356.66	1,397,866.67
Coeur d'Alene	Idaho	413,932.36	197,410.60	472,399.21	1,083,742.17
Kaniksu	Idaho	162,591.48	137,952.32	185,782.36	486,326.16
Kaniksu	Washington	99,426.54	-	134,320.68	233,747.22
Cabinet	Montana	102,058.22	103,197.46	149,858.06	355,113.74
Kootenai	Montana	39,076.14	28,233.00	-	67,309.14
Sub-Total	Idaho	2,134,653.04	421,155.19	1,369,184.16	3,924,992.39
Sub-Total	Montana	141,134.36	131,430,46	149,858.06	422,422.88
Sub-Total	Washington	99,426.54	-	134,320.68	233,747.22
Grand Total		$2,375,213.94	$552,585.65	$1,653,362.90	$4,581,162.49

National Park Service (1930-1939):

Park	State	Regular
Mount Rainier	Washington	$22,345.37

PERSONNEL

The following are the permanent personnel of the Bureau of Entomology and Plant Quarantine who were employed in the Northwestern Region during the calendar year 1940:

1. In charge of the Northwestern Region, H. E. Swanson, Senior Pathologist. Assistant Regional Leader, E. L. Joy, Forester.

2. Cooperative Local Control:

   a. Montana Operation:
   Technical Supervisor, A. S. Skoglund, Assistant Pathologist.

   b. Clearwater Operation, Idaho:
   Technical Supervisor, F. J. Heinrich, Associate Pathologist.
   Checking Supervisor, H. J. Faulkner, Chief Scientific Aid.

   c. St. Joe Operation, Idaho:
   Technical Supervisor, H. J. Hartman, Associate Forester.
   Assistant, J. C. Gynn, Agent.
   Checking Supervisor, W. F. Painter, Assistant Pathologist.

   d. Coeur d'Alene Operation, Idaho:
   Technical Supervisor, A. L. Pence, Jr., Assistant Pathologist.

   e. Kaniksu Operation, Idaho and Washington:
   Technical Supervisor, F. O. Walters, Associate Pathologist.
   Checking Supervisor, H. A. Brischle, Assistant Pathologist.

   f. Mount Rainier and Glacier National Parks and Mount Spokane Operation, Idaho, Montana, Washington:
   Technical Supervisor, M. C. Riley, Associate Forester.

3. Projects:

   a. Pine Disease Surveys and Effectiveness of Control Studies:
   In charge, R. L. MacLeod, Associate Pathologist.
   Assistant, C. R. Stillinger, Assistant Pathologist.

   b. Development of Ribes Eradication Methods:
   Ecological and Chemical, V. D. Moss*, Assistant Pathologist.
   Mechanical, J. F. Breakey*, Assistant Pathologist.
   C. M. Chapman, Chief Scientific Aid.

   c. Informational Work:
   In charge, E. L. Joy, Forester.
   Assistant, H. M. Cowling, Chief Scientific Aid.

*Personnel assigned to Northwestern Region by H. R. Offord, Pathologist in charge of methods development in the West.

4. Business Administration and Clerical Work:

a. E. G. Schmidt, Junior Administrative Assistant.
E. K. LaPrey, Field Assistant.

b. M. L. McWold, Senior Clerk.
E. L. Talso, Assistant Clerk-Stenographer.
M. Wiggs, Assistant Clerk-Stenographer. (Trans.Pear Psylla Control)

c. L. E. Klatt, Senior Clerk.
C. E. Davis, Assistant Clerk-Stenographer.
R. R. Rieth, Junior Clerk-Stenographer.
L. C. Eddy, Junior Typist (Trans. Pear Psylla Control).
D. E. Short, Junior Clerk-Stenographer.
M. M. McLean, Junior Clerk-Stenographer

d. H. D. Langley, Junior Administrative Assistant in charge of personnel.

The following are the personnel of the Forest Service in charge of blister rust control work on National Forest lands:

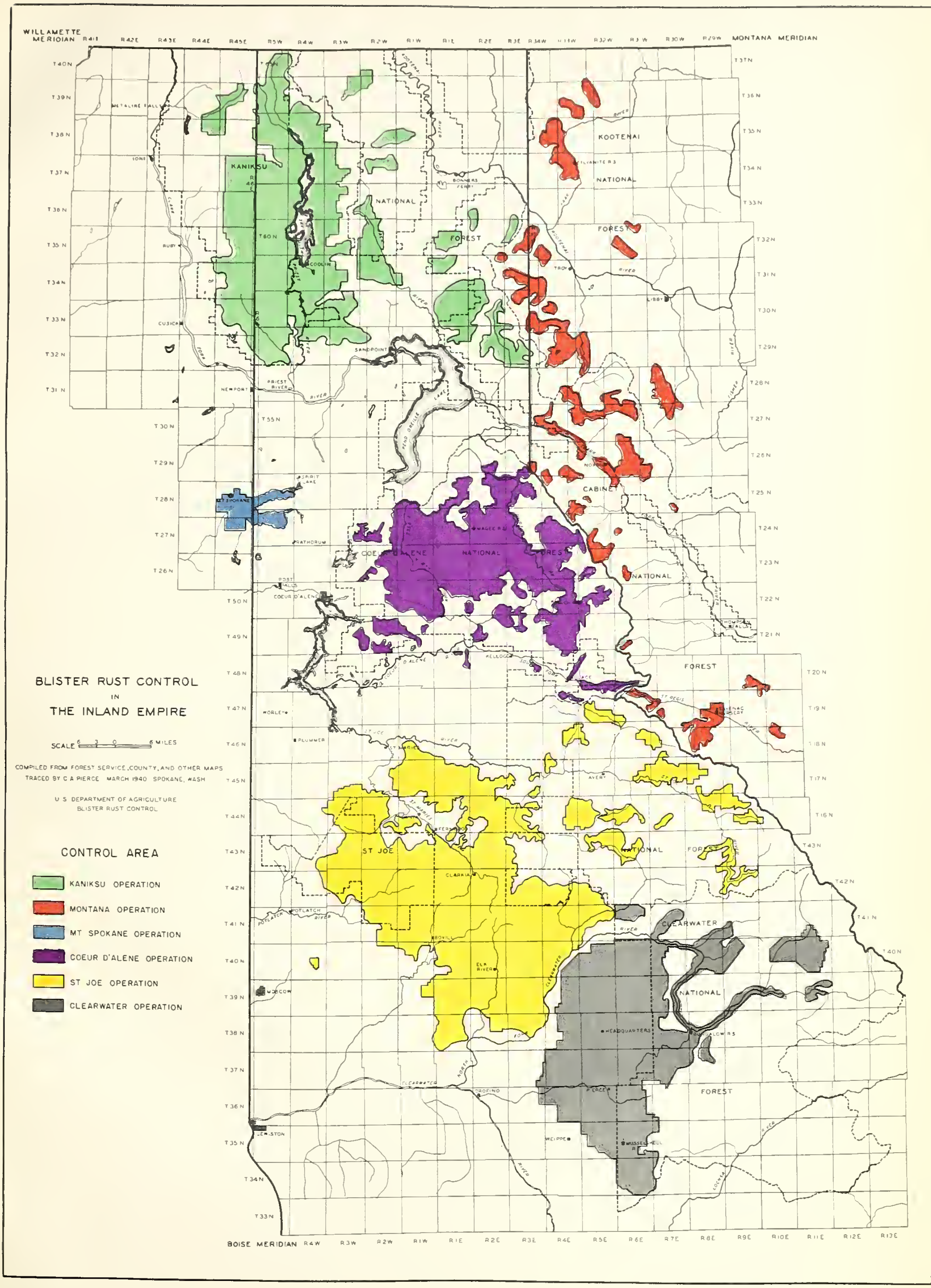
1. Cabinet and Kootenai National Forests, Montana - C. H. Johnson, Associate Pathologist.

2. Clearwater National Forest, Idaho - D. Kyle, Chief Scientific Aid.

3. St. Joe National Forest, Idaho - D. J. Moore, Assistant Pathologist and M. D. Oaks, Principal Agricultural Aid.

4. Coeur d'Alene National Forest, Idaho - N. D. Nelson, Associate Pathologist.

5. Kaniksu National Forest, Idaho and Washington - F. O. Walters, Associate Pathologist (Bureau of Entomology and Plant Quarantine and U. S. Forest Service), Kermit Miller, Assistant Pathologist



BLISTER RUST CONTROL
IN
THE INLAND EMPIRE
SCALE 6 3 0 6 MILES
COMPILED FROM FOREST SERVICE, COUNTY, AND OTHER MAPS
TRACED BY C A PIERCE MARCH 1940 SPOKANE, WASH
U S DEPARTMENT OF AGRICULTURE
BLISTER RUST CONTROL
CONTROL AREA
KANIKSU OPERATION
MONTANA OPERATION
MT SPOKANE OPERATION
COEUR D'ALENE OPERATION
ST JOE OPERATION
CLEARWATER OPERATION
WILLAMETTE MERIDIAN
MONTANA MERIDIAN
BOISE MERIDIAN
KANIKSU NATIONAL FOREST
KOOTENAI NATIONAL FOREST
CABINET NATIONAL FOREST
COEUR D'ALENE NATIONAL FOREST
ST JOE NATIONAL FOREST
CLEARWATER NATIONAL FOREST
SANDPOINT
NEWPORT
SPIRIT LAKE
RATHDRUM
POST FALLS
COEUR D'ALENE
PLUMMER
CLARKIA
BOVILL
ELK RIVER
HEADQUARTERS
WEIPPE
LEWISTON

RIBES ERADICATION, INLAND EMPIRE, 1940

By
Herman E. Swanson
Senior Pathologist

INTRODUCTION

This report summarizes the progress of blister rust control work in the commercial western white pine area of the Inland Empire (northern Idaho, eastern Washington and western Montana), and includes the work of all cooperating agencies. The work on national parks is not included in the Inland Empire summary, since the national parks are outside the commercial white pine area.

The Inland Empire report represents a summary of the following individual operation reports, each of which includes a National Forest and adjacent private and state lands (except Mount Spokane operation):

1. Montana Operation (Kootenai and Cabinet Forests).
2. Clearwater Operation.
3. St. Joe Operation.
4. Coeur d'Alene Operation.
5. Kaniksu Operation.
6. Mount Spokane Operation.

ORGANIZATION

The field program was smaller in 1940 than 1939. The principal reduction was in the ERA program. There were sufficient funds for the employment of all available certified relief workers in Idaho. Funds were not available and authority was not granted as in previous years for the employment of WPA workers from the state of Washington in Idaho. This accounts for the reduction in the ERA program. The bad fire season which prevailed necessitated continuous demands on CCC crews thereby reducing considerably the amount of time which they were available for blister rust control work. While heavy demands for fire duty were also placed on regular Forest Service blister rust crews, the enlarged size of this program together with an early start in the season permitted the employment of more effective man-days in 1940 than in 1939.

Continued interruptions caused by fire duty were serious handicaps to the orderly and efficient progress of ribes eradication. Nevertheless, the accomplishments in 1940 were greater than in 1939. An increase of 12,226 acres in acreage worked was achieved with the employment of 15,146 less man-days. Part of this was a result of improved methods, particularly through the use of the new claw-mattock ribes tool, and part was due to the lighter working conditions encountered. It is significant that on the average in 1940 there were only 170 ribes per acre, while in 1939 the average number of ribes per acre on the area worked was 272. This indicates that many of the more difficult areas have been worked and less difficult areas will be encountered in the future.

FIELD PROGRAM

The following tabulation shows the size of the blister rust control program in the field in the Inland Empire during the 1939 and the 1940 seasons:

Program*	Number Camps		Number Men	
	1939	1940	1939	1940
EQ-ERA	18	13	1,155	887
FS-ERA	5	7	285	379
FS-Regular	29	32	1,060	1,138
F-CCC	23	15	1,420	1,127
S-CCC	3	2	125	141
State-Coop.	2	2	75	66
Total	80	71	4,120	3,738

*Designations used in this report:

EQ	- Bureau of Entomology and Plant Quarantine.
FS	- Forest Service.
Reg.	- Program on regular departmental appropriations.
F-CCC	- Forest Service - Civilian Conservation Corps.
S-CCC	- State - Civilian Conservation Corps.
ERA	- Emergency Relief Program (WPA).
NIRA	- Public Works Program (PWA).
State-Coop.	- Program financed cooperatively by Bureau and State of Idaho.

METHODS

Brief mention should be made of three significant points in relation to field methods in respect to the 1940 field season.

1. The new claw-mattock ribes tool developed first in the 1938 season, its design improved in 1939 and used extensively during that year, was used throughout the entire field program during 1940. This tool not only facilitates the removal of ribes by reducing the time and effort required, but also takes out the complete vital root system. This latter point is particularly important since the breaking off of ribes at the root crown is practically eliminated. Improperly eradicated bushes have been one of the most serious factors in the rework problem.

2. For the first time since 1932 there was no operation employing the bulldozer method for ribes eradication. It appears quite definite that very little, if any, future bulldozer work for ribes eradication will be required.

3. During the last several years ribes eradication work has been confined to young stands of white pine which are most threatened by blister rust. Mature stands, in which blister rust will cause no damage before the timber is cut, have been carefully avoided. These mature areas have been retained in the "unworked" classification when in reality no control work is necessary for the protection of the present stand of timber. To clarify this situation, these areas are being segregated and classified accordingly. Adequate information is available to permit the segregation of 170,110 acres in this class.

EXPENDITURES FOR RIBES ERADICATION

The following tabulations include only those expenditures made in connection with the ribes eradication program. The statement of expenditures includes those federal funds expended from appropriations directly allotted to the Bureau of Entomology and Plant Quarantine and to the U. S. Forest Service, and state funds turned over to the Bureau by the State of Idaho.

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
INLAND EMPIRE

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$437,037.39
	ERA	77,722.16
	Total	514,759.55
Bureau of Entomology and Plant Quarantine	Regular	28,940.89
	ERA	234,604.00
	Total	263,544.89
State of Idaho	Idaho	10,034.48
Grand Total		$788,339.92

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
INLAND EMPIRE

Item	Forest Service			Bureau of Entomology and Plant Quarantine			State of Idaho	Total
	Regular	ERA	Total	Regular	ERA	Total		
Sal. perm. men	$ 12,468.88		$ 12,468.88	$26,966.66	$ 225.00	$ 27,191.66		$ 39,660.54
Sal. temp. men	69,435.46	$ 5,568.92	75,054.38		25,143.54	25,143.54		100,197.92
Wages, temp. labs.	266,189.74	54,058.29	320,248.03	1,629.20	159,494.63	161,123.83	$10,034.48	491,406.34
Subs. supplies	58,057.17	13,220.37	71,277.54	162.09	33,906.31	34,068.40		105,345.94
Equipment	15,042.33	543.05	15,585.38		2,540.82	2,540.82		18,126.20
Trucks	2,344.40	936.08	3,280.48					3,280.48
Travel and transp.	8,200.84	1,498.88	9,699.72	182.94	5,936.98	6,119.92		15,819.64
Chemicals	392.89	113.06	505.95					505.95
Twine	2,020.68	662.40	2,683.08					2,683.08
Other supplies	2,835.00	1,121.11	3,956.11		7,356.72	7,356.72		11,312.83
Total	$437,037.39	$77,722.16	$514,759.55	$28,940.89	$234,604.00	$263,544.89	$10,034.48	$788,338.92

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES BY PROGRAMS INLAND EMPIRE

Program	Number Effective Man Days	Expenditures According to Funds		Effective Man Day Cost
EQ-ERA	39,465	EQ-ERA	$229,014.00	$6.21
		EQ-Reg.	15,847.95	
		Total	244,861.95	
FS-ERA	12,082	FS-Reg.	13,066.66	7.57
		FS-ERA	77,029.16	
		EQ-ERA	192.76	
		EQ-Reg.	1,241.00	
		Total	91,529.58	
FS-Reg.	56,182	FS-Reg.	404,692.40	7.34
		FS-ERA	347.00	
		EQ-ERA	540.00	
		EQ-Reg.	6,971.94	
		Total	412,551.34	
State-Coop.	2,111	State	10,034.48	6.01
		EQ-Reg.	900.00	
		EQ-ERA	1,757.24	
		Total	12,691.72	
CCC	27,312	FS-Reg.	15,886.69	CCC Funds not Included
		FS-ERA	346.00	
		EQ-Reg.	3,980.00	
		Total	20,212.69	
EQ-ERA Winter Project		EQ-ERA	3,100.00	
Pine Disease Survey		FS-Reg.	2,204.85	
White Pine Survey		FS-Reg.	1,186.79	
Total Cost 1940 Program			$788,333.92	

	Forest Service	Bureau
Number of meals served	387,300	201,469
Average cost per meal	$0.191	$0.167
Pounds twine used	17,157	8,487
Pounds chemical used	16,310	3,847

SUMMARY OF RIBES ERADICATION, 1940
INLAND EMPIRE

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Total Gallons Spray
Open Reproduction	14,179	37,989	4,940	57,108	82,819	10,419,489	
Dense Reproduction	202	881	54	1,137	1,348	58,620	
Open Pole	12,421	13,488	1,493	27,402	17,385	1,755,682	
Dense Pole	2,153	1,900	86	4,139	1,710	162,019	
Open Mature	2,299	3,434	434	6,167	6,433	774,583	
Dense Mature	1,072			1,072	1	19	
Cutover	809	6,289	4,820	11,918	17,046	4,126,028	
Brush	264	99	95	458	568	70,646	
Burn		243		243	582	470,829	
All Upland	33,399	64,323	11,922	109,644	127,892	17,837,915	
Stream (Hand)	1,586	2,605	1,480	5,671	12,020	1,662,163	
Stream (Chemical)	222	131	156	509	951	44,040	14,680
Stream (Zone)	90	203		293	302	77,141	
All Stream	1,676	2,808	1,480	5,964	13,273	1,783,344	
All Types	35,075	67,131	12,402	115,608	141,165	19,621,259	

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man Days	Ribes	Gallons Spray
Open Reproduction	14,179	24,004	5,595,682		1.69	395	
Dense Reproduction	202	349	16,613		1.73	82	
Open Pole	12,421	6,961	963,454		.56	78	
Dense Pole	2,153	772	61,841		.36	29	
Open Mature	2,299	1,720	342,769		.75	149	
Dense Mature	1,072	1	19				
Cutover	809	1,307	256,607		1.62	317	
Brush	264	485	67,467		1.84	256	
All Upland	33,399	35,599	7,304,452		1.07	219	
Stream (Hand)	1,586	5,531	925,770		3.49	584	
Stream (Chemical)	222	430	15,408	5,136	1.94	69	23
Stream (Zone)	90	123	40,256		1.37	447	
All Stream	1,676	6,084	981,434		3.63	586	
All Types	35,075	41,683	8,285,886		1.19	236	

TABLE NO. 3B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray
Open Reproduction	37,989	53,623	4,475,931		1.41	118	
Dense Reproduction	881	904	40,355		1.03	46	
Open Pole	13,488	9,449	704,414		.70	52	
Dense Pole	1,900	905	99,289		.48	52	
Open Mature	3,434	4,413	419,289		1.29	122	
Cutover	6,289	9,469	3,150,183		1.51	501	
Brush	99	36	1,822		.36	18	
Burn	243	582	470,829		2.40	1,938	
All Upland	64,323	79,381	9,362,112		1.23	146	
Stream (Hand)	2,605	4,689	589,467		1.80	226	
Stream (Chemical)	131	343	18,489	6,163	2.62	141	47
Stream (Zone)	203	179	36,885		.88	182	
All Stream	2,808	5,211	644,841		1.86	230	
All Types	67,131	84,592	10,006,953		1.26	149	

TABLE NO. 3C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray
Open Reproduction	4,940	5,192	347,876		1.05	70	
Dense Reproduction	54	95	1,652		1.76	31	
Open Pole	1,493	975	87,814		.65	59	
Dense Pole	86	33	889		.38	10	
Open Mature	434	300	12,525		.69	29	
Cutover	4,820	6,270	719,238		1.30	149	
Brush	95	47	1,357		.50	14	
All Upland	11,922	12,912	1,171,351		1.08	98	
Stream (Hand)	1,480	1,800	146,926		1.22	99	
Stream (Chemical)	156	178	10,143	3,381	1.14	65	22
All Stream	1,480	1,978	157,069		1.34	106	
All Types	12,402	14,890	1,328,420		1.11	99	

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
INLAND EMPIRE

State	Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes
Idaho	First	EQ-ERA	6,394	11,931	1,658,178		1.87	259
		FS-ERA	2,022	1,841	253,510		.91	125
		FS-Reg.	4,125	8,220	2,038,752		1.99	494
		Cooperative	4,842	1,874	474,073		.39	98
		F-CCC	1,755	4,010	446,446	4,410	2.28	254
		Total	19,138	27,876	4,870,959	4,410	1.46	255
	Second	EQ-ERA	17,023	19,774	3,912,613	950	1.16	230
		FS-ERA	4,289	4,985	380,864		1.16	89
		FS-Reg.	29,741	33,462	3,588,145	1,995	1.13	121
		Cooperative	373	237	35,482		.64	95
		F-CCC	8,200	18,770	916,645		2.29	112
		S-CCC	1,091	1,667	136,505		1.53	125
		Total	60,717	78,895	8,970,254	2,945	1.30	148
	Third	EQ-ERA	4,780	5,027	582,084	2,110	1.05	122
		FS-ERA	487	250	24,398		.51	50
		FS-Reg.	3,389	3,366	250,546	1,271	.99	74
		F-CCC	2,002	3,792	128,251		1.89	64
		S-CCC	480	755	149,373		1.57	311
		Total	11,138	13,190	1,134,652	3,381	1.18	102
	All Workings	EQ-ERA	28,197	36,732	6,152,875	3,060	1.30	218
		FS-ERA	6,798	7,076	658,772		1.04	97
		FS-Reg.	37,255	45,048	5,877,443	3,266	1.21	158
		Cooperative	5,215	2,111	509,555		.40	98
		F-CCC	11,957	26,572	1,491,342	4,410	2.22	125
		S-CCC	1,571	2,422	285,878		1.54	182
		Total	90,993	119,961	14,975,865	10,736	1.32	165
Washington	First	FS-Reg.	6,359	5,357	2,555,239		.84	402
		F-CCC	109	346	38,022		3.17	349
		Total	6,468	5,703	2,593,261		.88	401
	Second	EQ-ERA	1,221	1,241	184,034		1.02	151
		FS-Reg.	2,811	1,553	638,172		.55	227
		F-CCC	690	930	75,443		1.35	109
		Total	4,722	3,724	897,649		.79	190
	Third	EQ-ERA	1,801	1,492	173,632		.83	96
	All Workings	EQ-ERA	3,022	2,733	357,666		.90	118
		FS-Reg.	9,170	6,910	3,193,411		.75	348
		F-CCC	799	1,276	113,465		1.60	142
		Total	12,991	10,919	3,664,542		.84	282
Montana	First	FS-ERA	4,479	4,382	428,764	726	.98	96
		FS-Reg.	3,121	3,366	352,890		1.08	113
		F-CCC	1,869	356	40,012		.19	21
		Total	9,469	8,104	821,666	726	.86	87
	Second	FS-ERA	371	556	47,584		1.50	128
		FS-Reg.	1,082	718	61,616	3,218	.66	57
		F-CCC	239	699	29,850		2.92	125
		Total	1,692	1,973	139,050	3,218	1.17	82
	Third	FS-ERA	150	68	6,069		.45	40
		FS-Reg.	313	140	14,067		.45	45
		Total	463	208	20,136		.45	43
	All Workings	FS-ERA	5,000	5,006	482,417	726	1.00	96
		FS-Reg.	4,516	4,224	428,573	3,218	.94	95
		F-CCC	2,108	1,055	69,862		.50	33
		Total	11,624	10,285	980,852	3,944	.88	84
Total	First	EQ-ERA	6,394	11,931	1,658,178		1.87	259
		FS-ERA	6,501	6,223	682,274	726	.96	105
		FS-Reg.	13,605	16,943	4,946,881		1.25	364
		Cooperative	4,842	1,874	474,073		.39	98
		F-CCC	3,733	4,712	524,480	4,410	1.26	140
		Total	35,075	41,683	8,285,886	5,136	1.19	236
	Second	EQ-ERA	18,244	21,015	4,096,647	950	1.15	225
		FS-ERA	4,660	5,541	428,448		1.19	92
		FS-Reg.	33,634	35,733	4,287,933	5,213	1.06	127
		Cooperative	373	237	35,482		.64	95
		F-CCC	9,129	20,399	1,021,938		2.23	112
		S-CCC	1,091	1,667	136,505		1.53	125
		Total	67,131	84,592	10,006,953	6,163	1.26	149
	Third	EQ-ERA	6,581	6,519	755,716	2,110	.99	115
		FS-ERA	637	318	30,467		.50	48
		FS-Reg.	3,702	3,506	264,613	1,271	.95	71
		F-CCC	2,002	3,792	128,251		1.89	64
		S-CCC	480	755	149,373		1.57	311
		Total	13,402	14,890	1,328,420	3,381	1.11	99
	All Workings	EQ-ERA	31,219	39,465	6,510,541	3,060	1.26	209
		FS-ERA	11,798	12,082	1,141,189	726	1.02	97
		FS-Reg.	50,941	56,182	9,499,427	6,484	1.10	186
		Cooperative	5,215	2,111	509,555		.40	98
		F-CCC	14,864	28,903	1,674,669	4,410	1.94	113
		S-CCC	1,571	2,422	285,878		1.54	182
		Total	115,608	141,165	19,621,259	14,680	1.22	170

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
INLAND EMPIRE

		Number of Acres Worked														
		By Forest Service					By Bureau of Entomology end Plant Querantine					Total				
		Federel					Federel					Federal				
State	Working	Forest Service	Public Domein	Totel	Stete	Private	Forest Service	Public Domain	Total	Stete	Privete	Forest Service	Public Domein	Total	State	Private	Total
Ideho	First	6,769		6,769	77	1,056	3,013	170	3,183	5,483	2,570	9,782	170	9,952	5,560	3,626	19,138
	Second	30,470	360	30,830	2,525	8,875	4,886	123	5,009	4,281	9,197	35,356	483	35,839	6,806	18,072	60,717
	Third	4,757		4,757	41	1,080	591	46	637	523	4,100	5,348	46	5,394	564	5,180	11,138
	Totel	41,996	360	42,356	2,643	11,011	8,490	339	8,829	10,287	15,867	50,486	699	51,185	12,930	26,878	90,993
Weshington	First	4,738		4,738	50	1,680						4,738		4,738	50	1,680	6,468
	Second	2,036		2,036		1,465	90		90	992	139	2,126		2,126	992	1,604	4,722
	Third									920	881				920	881	1,801
	Totel	6,774		6,774	50	3,145	90		90	1,912	1,020	6,864		6,864	1,962	4,165	12,991
Montene	First	7,873		7,873		1,596						7,873		7,873		1,596	9,469
	Second	1,244		1,244		448						1,244		1,244		448	1,692
	Third	439		439		24						439		439		24	463
	Totel	9,556		9,556		2,068						9,556		9,556		2,068	11,624
Total	First	19,380		19,380	127	4,332	3,013	170	3,183	5,483	2,570	22,393	170	22,563	5,610	6,902	35,075
	Second	33,750	360	34,110	2,525	10,788	4,976	123	5,099	5,273	9,336	38,726	483	39,209	7,798	20,124	67,131
	Third	5,196		5,196	41	1,104	591	46	637	1,443	4,981	5,787	46	5,833	1,484	6,085	13,402
	Totel	58,326	360	58,686	2,693	16,224	8,580	339	8,919	12,199	16,887	66,906	699	67,605	14,892	33,111	115,608

TABLE NO. 6

TOTAL RIBES BY SPECIES ERADICATED, 1940
INLAND EMPIRE

			Ribes by Species							
Working	Eradicetion Type	Acres	Ribes lacustre	Ribes viscosissimum	Ribes petiolere	Ribes inerme	Ribes irriguum	Ribes coloredense	Ribes triste	Totel Ribes
First	Open Reoroduction	14,179	1,772,943	3,821,540	20		3	1,176		5,595,682
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	12,421	476,529	476,765		8,384	1,776			963,454
	Dense Pole	2,153	52,871	8,970						61,841
	Open Meture	2,299	285,282	26,204	240		31,043			342,769
	Dense Mature	1,072	3					16		19
	Cutover	809	205,125	49,698		1,784				256,607
	Brush	264	8,592	58,875						67,467
	All Upland	33,399	2,804,832	4,455,114	260	10,168	32,822	1,256		7,304,452
	Stream	1,676	793,617	39,766	23,143	124,622		286		981,434
	All Types	35,075	3,598,449	4,494,880	23,403	134,790	32,822	1,542		8,285,886
Second	Open Reoroduction	37,989	1,224,825	3,195,791	12,194	35,206	5,324		2,591	4,475,931
	Dense Reproduction	881	18,902	21,453						40,355
	Open Pole	13,488	322,154	368,745	931	12,584				704,414
	Dense Pole	1,900	67,055	32,234						99,289
	Open Mature	3,434	180,933	220,645	275		17,436			419,289
	Cutover	6,289	477,817	2,651,791	19,732	758	85			3,150,183
	Brush	99	456	1,366						1,822
	Burn	243	89,566	381,263						470,829
	All Upland	64,323	2,381,708	6,873,288	33,132	48,548	22,845		2,591	9,362,112
	Stream	2,808	501,164	31,029	30,781	75,282	21		6,564	644,841
	All Types	67,131	2,882,872	6,904,317	63,913	123,830	22,866		9,155	10,006,953
Third	Open Reproduction	4,940	168,579	171,706	5,785	1,806				347,876
	Dense Reproduction	54	1,182	470						1,652
	Open Pole	1,493	42,928	44,869	17					87,814
	Dense Pole	86	657	232						889
	Open Meture	434	8,715	3,810						12,525
	Cutover	4,820	127,197	579,767	12,131		143			719,238
	Brush	95	379	978						1,357
	All Upland	11,922	349,637	801,832	17,933	1,806	143			1,171,351
	Stream	1,480	97,919	1,660	21,108	36,382				157,069
	All Types	13,402	447,556	803,492	39,041	38,188	143			1,328,420
All Workings	Open Reproduction	57,108	3,166,347	7,189,037	17,999	37,012	5,327	1,176	2,591	10,419,489
	Dense Reproduction	1,137	23,571	34,985				64		58,620
	Open Pole	27,402	841,611	890,379	948	20,968	1,776			1,755,682
	Dense Pole	4,139	120,583	41,436						162,019
	Open Meture	6,167	474,930	250,659	515		48,479			774,583
	Dense Meture	1,072	3					16		19
	Cutover	11,918	810,139	3,281,256	31,863	2,542	228			4,126,028
	Brush	458	9,427	61,219						70,646
	Burn	243	89,566	381,263						470,829
	All Upland	109,644	5,536,177	12,130,234	51,325	60,522	55,810	1,256	2,591	17,837,915
	Stream	5,964	1,392,700	72,455	75,032	236,286	21	286	6,564	1,783,344
	All Types	115,508	6,928,877	12,202,689	126,357	296,808	55,831	1,542	9,155	19,621,259

TABLE NO. 7 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Open Reproduction	475,300	112,704	10,051	598,055	745,261	186,942,700	
Dense Reproduction	93,476	7,885	123	101,484	46,840	6,638,119	
Open Pole	280,078	52,758	2,867	335,703	165,539	28,680,495	
Dense Pole	71,136	7,334	201	78,671	18,254	2,728,202	
Open Mature	652,670	40,487	2,039	695,196	327,215	69,576,712	
Dense Mature	69,024	1,952		70,976	8,786	1,187,649	
Cutover	48,513	39,829	8,926	97,268	105,943	31,146,890	
Brush	24,323	2,214	287	26,824	26,715	5,084,841	
Burn	10,135	589		10,724	8,034	3,940,992	
Subalpine	3,255	231	88	3,574	2,351	479,573	
Meadow-Field	2,569	10		2,579	152	12,203	
All Upland	1,730,479	265,993	24,582	2,021,054	1,455,090	336,418,376	
Stream (Hand)	118,105	45,362	11,025	174,492	288,717	68,415,860	
Stream (Chemical)	22,518	8,692	991	32,201	66,888	5,315,492	1,740,959
Stream (Slash)	1,578	53	40	1,671	19,489	1,008,814	
Stream (Machine)	2,150	102		2,252	12,799	1,222,576	
Stream (Zone)	208	4,143		4,351	3,268	507,427	
All Stream	121,996	49,660	11,025	182,681	391,161	76,470,169	
All Types	1,852,475	315,653	35,607	2,203,735	1,846,251	412,888,545	

TABLE NO. 7A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis		
					Man Days	Ribes	Gallons Spray
Open Reproduction	475,300	590,166	168,884,216		1.24	355	
Dense Reproduction	93,476	40,907	6,075,661		.44	65	
Open Pole	280,078	132,632	24,985,735		.47	89	
Dense Pole	71,136	15,266	2,404,191		.21	34	
Open Mature	652,670	299,423	66,075,180		.46	101	
Dense Mature	69,024	8,108	1,114,253		.12	16	
Cutover	48,513	47,042	16,354,780		.97	337	
Brush	24,323	24,416	4,847,088		1.00	199	
Burn	10,135	7,171	3,414,938		.71	337	
Subalpine	3,255	2,170	463,787		.67	142	
Meadow-Field	2,569	151	12,131		.06	5	
All Upland	1,730,479	1,167,452	294,631,960		.67	170	
Stream (Hand)	118,105	216,285	56,451,089		1.83	478	
Stream (Chemical)	22,518	53,617	4,573,428	1,493,541	2.38	203	66
Stream (Slash)	1,578	18,051	971,517		11.44	616	
Stream (Machine)	2,150	12,341	1,176,076		5.74	547	
Stream (Zone)	208	270	55,658		1.30	268	
All Stream	121,996	300,564	63,227,768		2.46	518	
All Types	1,852,475	1,468,016	357,859,728		.79	193	

TABLE NO. 7B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray
Open Reproduction	112,704	142,636	17,021,882		1.27	151	
Dense Reproduction	7,885	5,768	531,910		.73	67	
Open Pole	52,758	30,792	3,416,392		.58	65	
Dense Pole	7,334	2,877	317,962		.39	43	
Open Mature	40,487	26,674	3,360,658		.66	83	
Dense Mature	1,952	678	73,396		.35	38	
Cutover	39,829	47,303	13,484,490		1.19	339	
Brush	2,214	2,113	219,842		.95	99	
Burn	589	863	526,054		1.47	893	
Subalpine	231	142	10,438		.61	45	
Meadow-Field	10	1	72		.10	7	
All Upland	265,993	259,847	38,973,096		.98	147	
Stream (Hand)	45,362	58,868	10,044,179		1.30	221	
Stream (Chemical)	8,692	12,517	692,435	230,875	1.44	80	27
Stream (Slash)	53	796	17,294		15.02	326	
Stream (Machine)	102	458	46,500		4.49	456	
Stream (Zone)	4,143	2,998	451,769		.72	109	
All Stream	49,660	75,637	11,252,177		1.52	227	
All Types	315,653	335,484	50,225,273		1.06	159	

TABLE NO. 7C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray
Open Reproduction	10,051	12,459	1,026,602		1.24	102	
Dense Reproduction	123	165	30,548		1.34	248	
Open Pole	2,867	2,115	278,368		.74	97	
Dense Pole	201	111	6,049		.55	30	
Open Mature	2,039	1,118	140,874		.55	69	
Cutover	8,926	11,598	1,307,620		1.30	146	
Brush	287	186	17,911		.65	62	
Subalpine	88	39	5,348		.44	61	
All Upland	24,582	27,791	2,813,320		1.13	114	
Stream (Hand)	11,025	13,564	1,920,595		1.23	174	
Stream (Chemical)	991	754	49,629	16,543	.76	50	17
Stream (Slash)	40	642	20,000		16.05	500	
All Stream	11,025	14,960	1,990,224		1.36	181	
All Types	35,607	42,751	4,803,544		1.20	135	

TABLE NO. 8

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1940
INLAND EMPIRE

State	Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis	
							Man Days	Ribes
Idaho	First	EQ-Reg.	44,572	15,195	3,913,072		.34	88
		FS-Reg.	138,101	152,326	41,093,377	280,205	1.10	298
		EQ-NIRA	61,375	37,916	13,414,672	24,200	.62	219
		FS-NIRA	270,392	160,637	47,282,380	113,170	.59	175
		EQ-ERA	335,559	251,338	63,882,328	128,289	.75	190
		FS-ERA	34,628	34,208	6,859,911		.93	198
		Cooperative	219,676	104,078	30,882,002	339,769	.47	141
		F-CCC	349,743	410,931	83,083,014	315,742	1.17	238
		S&P-CCC	166,813	127,659	26,122,385	234,341	.77	156
		Total	1,620,859	1,294,288	316,533,141	1,435,716	.80	195
	Second	FS-Reg.	83,026	82,896	11,747,001	42,362	1.00	141
		EQ-NIRA	2,818	1,888	451,021	3,355	.67	160
		FS-NIRA	16,342	7,262	966,499	8,007	.44	59
		EQ-ERA	99,446	94,159	17,225,390	52,956	.95	173
		FS-ERA	14,822	12,817	1,331,686	2,044	.86	90
		Cooperative	9,548	6,441	991,794	13,227	.67	104
		F-CCC	48,123	83,784	8,315,663	47,292	1.74	173
		S&P-CCC	15,283	19,430	4,510,398	51,086	1.27	295
		Total	289,408	308,677	45,539,452	220,329	1.07	157
	Third	FS-Reg.	9,851	10,479	1,348,582	4,130	1.05	137
		FS-NIRA	914	747	127,700	1,922	.82	140
		EQ-ERA	10,093	11,700	1,261,563	5,135	1.16	125
		FS-ERA	771	569	68,599	348	.74	89
		Cooperative	324	72	7,092		.22	22
		F-CCC	7,056	12,471	1,055,302	5,008	1.77	150
		S&P-CCC	846	917	166,678		1.08	197
		Total	29,855	36,955	4,035,516	16,543	1.24	135
	All Workings	EQ-Reg.	44,572	15,195	3,913,072		.34	88
		FS-Reg.	230,978	245,701	54,188,950	326,697	1.06	235
		EQ-NIRA	64,193	39,804	13,865,693	27,555	.62	216
		FS-NIRA	287,648	168,646	48,376,579	123,099	.59	168
		EQ-ERA	445,098	357,197	82,369,281	186,380	.80	185
		FS-ERA	50,221	47,594	8,260,196	2,392	.95	164
		Cooperative	229,548	110,591	31,880,888	352,996	.48	139
		F-CCC	404,922	507,186	92,453,979	368,042	1.25	228
		S&P-CCC	182,942	148,006	30,799,461	285,427	.81	168
		Total	1,940,122	1,639,320	366,108,109	1,672,588	.84	189
Washington	First	FS-Reg.	8,594	10,080	4,100,764		1.17	477
		EQ-NIRA	26,733	11,711	4,348,258		.44	163
		FS-NIRA	34,417	12,708	3,858,496		.37	112
		EQ-ERA	21,423	35,181	10,074,443		1.64	470
		F-CCC	19,741	21,426	3,254,404		1.09	165
		Total	110,908	91,106	25,636,365		.82	231
	Second	FS-Reg.	3,829	2,238	717,619		.58	187
		EQ-ERA	11,617	12,000	2,608,061		1.03	225
		FS-ERA	1,949	1,678	154,764		.86	79
		F-CCC	2,587	3,279	232,829		1.27	90
		Total	19,982	19,195	3,713,273		.96	186
	Third	EQ-ERA	3,902	3,139	625,695		.80	160
	All Workings	FS-Reg.	12,423	12,318	4,818,383		.99	388
		EQ-NIRA	26,733	11,711	4,348,258		.44	163
		FS-NIRA	34,417	12,708	3,858,496		.37	112
		EQ-ERA	36,942	50,319	13,308,199		1.36	360
		FS-ERA	1,949	1,678	154,764		.85	79
		F-CCC	22,328	24,705	3,487,233		1.11	156
		Total	134,792	113,439	29,975,333		.84	222
Montana	First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334
		FS-Reg.	8,656	9,565	1,446,312	2,452	1.11	167
		EQ-NIRA	21,773	8,027	2,158,067		.37	99
		FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211
		EQ-ERA	42,313	20,386	3,292,671	1,330	.48	78
		FS-ERA	10,710	15,783	2,382,840	10,181	1.47	222
		F-CCC	13,658	9,757	1,263,790	2,780	.71	93
		Total	120,708	82,622	15,690,222	57,825	.68	130
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		FS-Reg.	1,820	1,491	151,306	5,376	.82	83
		EQ-ERA	1,342	1,597	265,637		1.19	198
		FS-ERA	2,080	2,456	202,732	1,040	1.18	97
		F-CCC	402	1,098	53,463		2.71	133
		Total	6,263	7,612	972,548	10,546	1.22	155
	Third	FS-Reg.	1,052	1,813	77,224		1.72	73
		EQ-ERA	648	777	59,040		1.20	91
		FS-ERA	150	68	6,069		.45	40
		Total	1,850	2,658	142,333		1.44	77
	All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380
		FS-Reg.	11,528	12,869	1,674,842	7,828	1.12	145
		EQ-NIRA	21,773	8,027	2,158,067		.37	99
		FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211
		EQ-ERA	44,303	22,760	3,617,348	1,330	.51	82
		FS-ERA	12,940	18,307	2,591,641	11,221	1.41	200
		F-CCC	14,060	10,845	1,317,253	2,780	.77	94
		Total	128,821	92,892	16,805,103	68,371	.72	130
Idaho Washington Montana	First	EQ-Reg.	45,955	17,510	4,375,372	30,665	.38	95
		FS-Reg.	155,351	171,971	46,640,453	282,657	1.11	300
		EQ-NIRA	109,881	57,654	19,920,997	24,200	.52	181
		FS-NIRA	327,024	190,134	55,825,118	123,587	.58	171
		EQ-ERA	399,295	306,905	77,249,442	129,619	.77	193
		FS-ERA	45,338	49,991	9,242,751	10,181	1.10	204
		Cooperative	219,676	104,078	30,882,002	339,769	.47	141
		F-CCC	383,142	442,114	87,601,208	318,522	1.15	229
		S&P-CCC	166,813	127,659	26,122,385	234,341	.77	156
		Total	1,852,475	1,468,016	357,859,728	1,493,541	.79	193
	Second	EQ-Reg.	619	980	299,410	4,130	1.58	484
		FS-Reg.	88,675	86,625	12,615,926	47,738	.98	142
		EQ-NIRA	2,818	1,888	451,021	3,355	.67	160
		FS-NIRA	16,342	7,262	966,499	8,007	.44	59
		EQ-ERA	112,405	107,756	20,099,088	52,956	.96	179
		FS-ERA	18,851	16,951	1,689,192	3,084	.90	90
		Cooperative	9,548	6,441	991,794	13,227	.67	104
		F-CCC	51,112	88,151	8,601,955	47,292	1.72	168
		S&P-CCC	15,283	19,430	4,510,398	51,086	1.27	295
		Total	315,653	335,484	50,225,273	230,875	1.05	159
	Third	FS-Reg.	10,903	12,292	1,425,806	4,130	1.13	131
		FS-NIRA	914	747	127,700	1,922	.82	140
		EQ-ERA	14,643	15,615	1,946,298	5,135	1.07	133
		FS-ERA	921	637	74,658	348	.69	81
		Cooperative	324	72	7,092		.22	22
		F-CCC	7,056	12,471	1,055,302	5,008	1.77	150
		S&P-CCC	846	917	166,678		1.09	197
		Total	35,607	42,751	4,803,544	16,543	1.20	135
	All Workings	EQ-Reg.	46,574	18,490	4,674,782	34,795	.40	100
		FS-Reg.	254,929	270,888	60,682,195	334,525	1.06	238
		EQ-NIRA	112,699	59,542	20,372,018	27,555	.53	181
		FS-NIRA	344,280	198,143	56,919,317	133,516	.58	165
		EQ-ERA	526,343	430,276	99,294,828	187,710	.82	189
		FS-ERA	65,110	67,579	11,006,601	13,613	1.04	169
		Cooperative	229,548	110,591	31,880,888	352,996	.48	139
		F-CCC	441,310	542,736	97,258,465	370,822	1.23	220
		S&P-CCC	182,942	148,006	30,799,461	285,427	.81	168
		Total	2,203,735	1,946,251	412,888,545	1,740,959	.84	197

TABLE NO. 9

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1940
INLAND EMPIRE

State	Working	Number of Acres Worked by Ownership Classes					Total
		Federal			State	Private	
		Forest Service	Public Domain	Total			
Idaho	First	852,677	16,482	869,159	263,414	488,286	1,620,859
	Second	160,502	4,992	165,494	39,578	84,336	289,408
	Third	16,373	142	16,515	3,823	9,517	29,855
	Total	1,029,552	21,616	1,051,168	306,815	582,139	1,940,122
Washington	First	56,663	315	56,978	6,832	47,098	110,908
	Second	6,448	60	6,508	3,935	9,539	19,982
	Third				2,114	1,788	3,902
	Total	63,111	375	63,486	12,881	58,425	134,792
Montana	First	100,006		100,006	696	20,006	120,708
	Second	4,305		4,305		1,958	6,263
	Third	774		774		1,076	1,850
	Total	105,085		105,085	696	23,040	128,821
Total	First	1,009,346	16,797	1,026,143	270,942	555,390	1,852,475
	Second	171,255	5,052	176,307	43,513	95,833	315,653
	Third	17,147	142	17,289	5,937	12,381	35,607
	Total	1,197,748	21,991	1,219,739	320,392	663,604	2,203,735

TABLE NO. 10

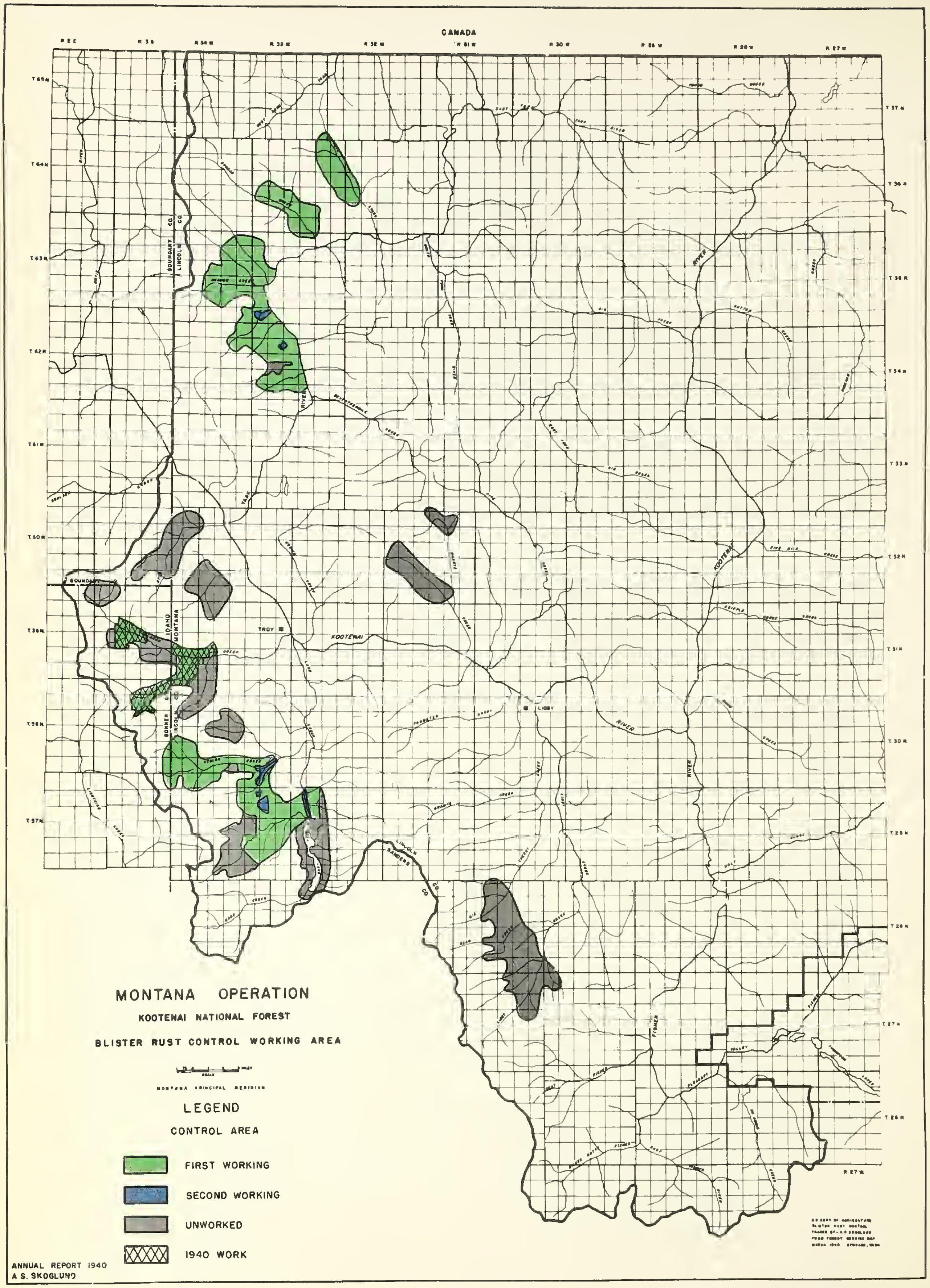
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1940
INLAND EMPIRE

State	Ownership Class	Number of Acres			Acres Mature Stands on Which Working is deferred	Total Acres White Pine
		Worked	Unworked	Total		
Idaho	Forest Service	852,677	247,161	1,099,838	30,252	1,130,090
	Public Domain	16,482	14,068	30,550	1,040	31,590
	Sub-total Federal	869,159	261,229	1,130,388	31,292	1,161,680
	State	263,414	49,456	312,870	32,080	344,950
	Private	488,286	222,197	710,483	90,542	801,025
	Total	1,620,859	532,882	2,153,741	153,914	2,307,655
Washington	Forest Service	56,663	35,227	91,890		91,890
	Public Domain	315		315		315
	Sub-total Federal	56,978	35,227	92,205		92,205
	State	6,832	3,018	9,850		9,850
	Private	47,098	11,942	59,040		59,040
	Total	110,908	50,187	161,095		161,095
Montana	Forest Service	100,006	49,813	149,819	13,706	163,525
	State	696	234	930		930
	Private	20,006	13,789	33,795	2,490	36,285
	Total	120,708	63,836	184,544	16,196	200,740
Total	Forest Service	1,009,346	332,201	1,341,547	43,958	1,385,505
	Public Domain	16,797	14,068	30,865	1,040	31,905
	Sub-total Federal	1,026,143	346,269	1,372,412	44,998	1,417,410
	State	270,942	52,708	323,650	32,080	355,730
	Private	555,390	247,928	803,318	93,032	896,350
	Total	1,852,475	646,905	2,499,380	170,110	2,669,490

TABLE NO. 11

TOTAL RIBES BY SPECIES ERADICATED, 1923-1940
INLAND EMPIRE

Working	Eradication Type	Acres	Ribes by Species								Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribea coloradense	Ribes triste	Ribes acerifolium	
First	Open Reproduction	475,300	44,606,285	122,554,254	180,592	1,071,450	469,314	1,176	1,145		168,884,216
	Dense Reproduction	93,476	3,159,053	2,759,118	15,767	104,631	34,813	2,279			6,075,661
	Open Pole	280,078	12,480,358	11,864,707	63,582	349,667	223,045		462	3,914	24,985,735
	Dense Pole	71,136	1,471,667	884,152	1,651	36,301	10,420				2,404,191
	Opan Mature	652,670	43,050,004	21,957,661	225,205	363,002	470,186	7,069	26	2,027	66,075,180
	Dense Mature	69,024	818,347	249,393	1,104	42,382	2,839	188			1,114,253
	Cutover	48,513	5,728,273	10,453,506	43,873	90,333	38,795				16,354,780
	Brush	24,323	1,522,287	3,187,593	19,257	97,116	20,835				4,847,088
	Burn	10,135	706,582	2,671,736	8,895	18,433	9,292				3,414,938
	Subalpine	3,255	326,851	136,917		19					463,787
	Meadow-Field	2,569	5,010			7,121					12,131
	All Upland	1,730,479	113,874,717	176,719,037	559,926	2,180,455	1,279,539	10,712	1,633	5,941	294,631,960
	Stream	121,996	41,728,637	1,990,370	6,310,427	13,009,370	116,220	31,905	21,255	19,584	63,227,768
	All Types	1,852,475	155,603,354	178,709,407	6,870,353	15,189,825	1,395,759	42,617	22,888	25,525	357,859,728
Second	Open Reproduction	112,704	5,639,125	11,235,002	47,795	83,133	24,236		2,591		17,031,882
	Densa Reproduction	7,885	360,742	169,454	4	1,627	83				531,910
	Open Pole	52,758	1,727,048	1,637,923	18,708	30,977	1,736				3,416,392
	Dense Pole	7,334	238,196	73,045	3,960	2,761					317,962
	Open Mature	40,487	1,801,890	1,500,992	16,086	14,440	26,983		267		3,360,658
	Dense Mature	1,952	59,675	12,838		658	225				73,396
	Cutover	59,829	3,107,822	10,276,846	66,732	22,535	10,555				13,484,490
	Brush	2,214	68,503	150,464		875					219,842
	Burn	589	111,220	409,387	5,447						526,054
	Subalpine	231	5,431	5,007							10,438
	Meadow-Field	10	72								72
	All Upland	265,993	13,119,724	25,470,958	158,732	157,006	63,818		2,858		38,973,096
	Stream	49,660	6,450,060	768,746	1,914,696	1,932,432	31,532		154,711		11,252,177
	All Types	315,653	19,569,784	26,239,704	2,073,428	2,089,438	95,350		157,569		50,225,273
Third	Open Reproduction	10,051	542,597	474,531	7,468	1,806	200				1,026,602
	Dense Reproduction	123	24,708	5,840							30,548
	Open Pole	2,867	170,287	108,058	17		6				278,368
	Dense Pole	201	5,752	297							6,049
	Open Mature	2,039	104,384	36,490							140,874
	Cutover	8,926	611,478	681,864	14,135		143				1,307,620
	Brush	287	4,915	12,996							17,911
	Subalpine	88	2,510	2,838							5,348
	All Upland	24,582	1,466,631	1,322,914	21,620	1,806	349				2,813,320
	Stream	11,025	965,470	27,943	515,453	478,976			2,382		1,990,224
	All Types	35,607	2,432,101	1,350,857	537,073	480,782	349		2,382		4,803,544
All Workings	Open Reproduction	598,055	50,788,007	134,263,787	235,855	1,156,389	493,750	1,176	3,736		186,942,700
	Dense Reproduction	101,484	3,544,503	2,934,412	15,771	106,258	34,896	2,279			6,638,119
	Open Pole	335,703	14,377,693	13,610,688	82,307	380,644	224,787		462	3,914	28,680,495
	Dense Pole	78,671	1,715,615	957,494	5,611	39,062	10,420				2,728,202
	Open Mature	695,196	44,956,278	23,495,143	241,291	377,442	497,169	7,069	293	2,027	69,576,712
	Dense Mature	70,976	878,022	262,231	1,104	43,040	3,064	188			1,187,649
	Cutover	97,268	9,447,573	21,412,216	124,740	112,868	49,493				31,146,890
	Brush	26,824	1,595,705	3,351,053	19,257	97,991	20,835				5,084,841
	Burn	10,724	817,802	3,081,123	14,342	18,433	9,292				3,940,992
	Subalpine	3,574	334,792	144,762		19					479,573
	Meadow-Field	2,579	5,082			7,121					12,203
	All Upland	2,021,054	128,461,072	203,512,909	740,278	2,339,267	1,343,706	10,712	4,491	5,941	336,418,376
	Stream	182,681	49,144,167	2,787,059	8,740,576	15,420,778	147,752	31,905	178,348	19,584	76,470,169
	All Types	2,203,735	177,605,239	206,299,968	9,480,854	17,760,045	1,491,458	42,617	182,839	25,525	412,888,545


MONTANA OPERATION
KOOTENAI NATIONAL FOREST
BLISTER RUST CONTROL WORKING AREA
LEGEND
CONTROL AREA
FIRST WORKING
SECOND WORKING
UNWORKED
1940 WORK
ANNUAL REPORT 1940
A. S. SKOGLUND
CANADA
BOUNDARY CO.
LINCOLN CO.
IDAHO
MONTANA
BONNER CO.
LINCOLN
SANDERS CO.
TROY
LIBBY
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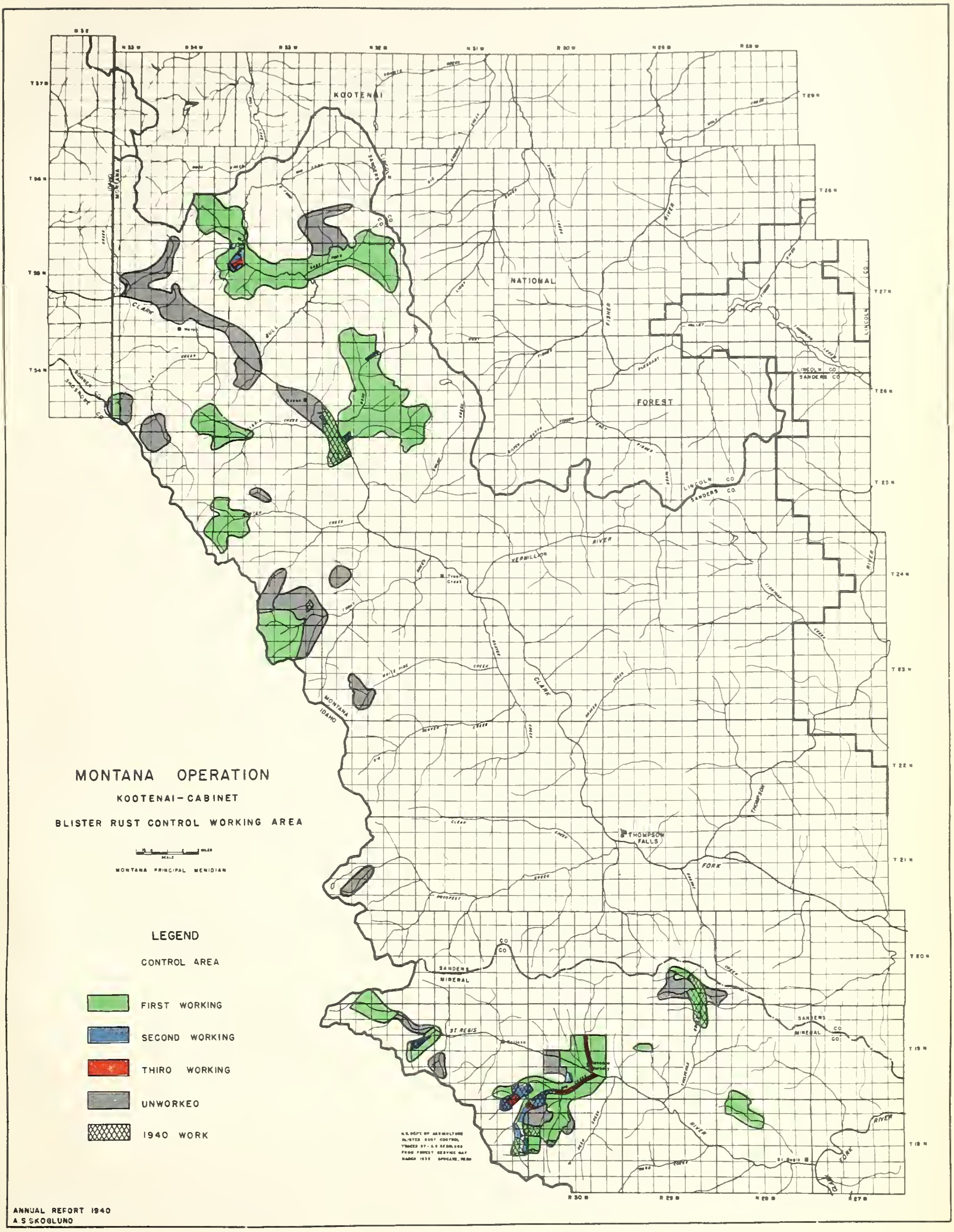

MONTANA OPERATION
KOOTENAI-CABINET
BLISTER RUST CONTROL WORKING AREA
MONTANA PRINCIPAL MERIDIAN
LEGEND
CONTROL AREA
FIRST WORKING
SECOND WORKING
THIRD WORKING
UNWORKED
1940 WORK
KOOTENAI
NATIONAL
FOREST
THOMPSON FALLS
ANNUAL REPORT 1940
A S SKOGLUND

RIBES ERADICATION, MONTANA OPERATION, 1940

By
C. H. Johnson, Associate Pathologist, U. S. Forest Service
A. S. Skoglund, Assistant Pathologist

INTRODUCTION

During 1940, blister rust control operations were conducted in the Cabinet and Kootenai National Forests. There were in operation three regular fund camps, four ERA camps, and two contingents of CCC enrollees. The personnel of all camps spent a large part of June and most of July on fires, but despite these interruptions first and second workings were extended over all areas designated for eradication work.

ORGANIZATION AND ADMINISTRATION

The first camp was established on April 29 and the last camp on May 25. The camps were discontinued between September 28 and October 21 with the exception of the pruning camp which continued until November 10.

Blister rust control personnel of the Bureau of Entomology and Plant Quarantine and the U. S. Forest Service cooperated in all matters relative to the efficient conduct of field operations. Field headquarters were established for the Cabinet National Forest camps on the East Fork of Big Creek near Haugan, Montana. All camps in the Kootenai National Forest were located along pack trails and were supplied from a base camp near the junction of the North and South Forks of Callahan Creek.

Supplies for all camps were transported by railroad, auto freight, and Government trucks from the Forest Service warehouse at Spokane, Washington.

LOCATION AND DESCRIPTION OF AREAS

Both regular fund and relief workers were engaged in eradication on the East, West, and Middle Forks of Big Creek and on Rainy Creek and Twelve Mile Creeks. As a rule ERA workers were assigned to the heavier ribes concentrations. CCC enrollees located at Haugan, Montana, performed some work on Rainy Creek. A second contingent worked in the Trout Creek District and in the vicinity of Noxon, Montana.

Heavy concentrations of ribes and severe working conditions were encountered in the Upper Middle Fork and Rainy Creek drainages, but over all other areas, working conditions and ribes were relatively light. The bulk of all operations was confined to the open reproduction type on burned-over lands.

Only ERA and regular fund workers were used in the Kootenai National Forest. Camps were located on the North and South Forks of Callahan Creek. The South Fork of Callahan Creek was logged from 1923 to 1926 and is now supporting a splendid stand of white pine reproduction. The area is

rugged, but it was not necessary to extend eradication beyond the previous cutting limits. Ribes concentrations and working conditions were of varying intensities, ranging from light to very heavy.

METHODS AND EQUIPMENT

Two-man crews with string lines in place proved the more satisfactory method of procedure for initial work. On second working over open sites, larger crews stringing lines as they progressed yielded good results.

During the past season particular attention was given to the matter of working short strips within blocks ranging from three to ten acres in extent. No comparative tests were made to determine the advantage of short strips over long strips, but it is believed that in heavy concentrations there is an increase in the amount of work a man will accomplish in a day.

From a limited amount of work performed in connection with the short strip procedure, the following points favoring this practice have been observed:

1. Greater uniformity of motion by workers maintained throughout the day.
2. Better supervision due to the fact that men were confined to definite limits and had equality in working conditions.
3. Clearer picture as to what constituted an acre of ground.

TAGGING METHOD

Tagging was continued on a limited scale with the dual purpose of determining the value of a 100 per cent advance survey before eradication and of learning what could be accomplished toward finding a larger percentage of ribes commonly missed by eradicators. A complete report of tagging as studied by the methods development project will be presented as a separate paper.

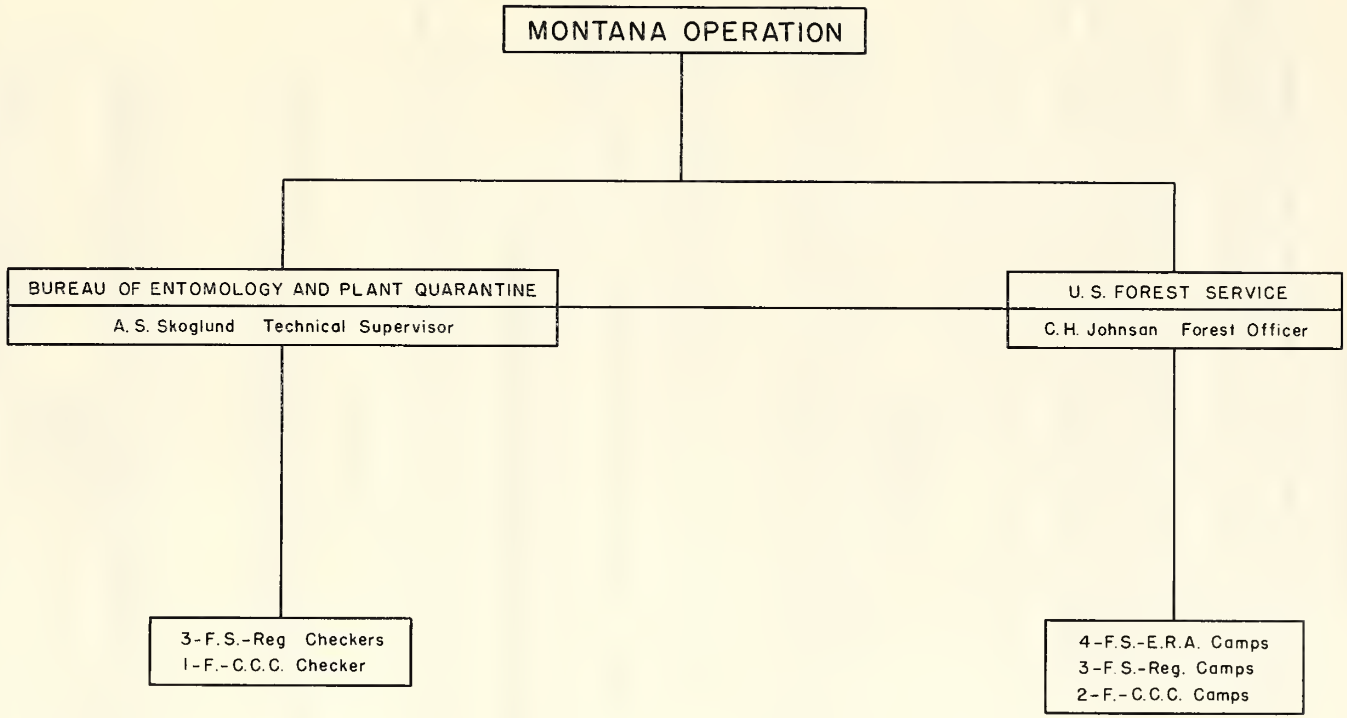
ERADICATION AND PLANTING

Eradication of ribes in conjunction with a white pine planting operation was inaugurated in the Trout Creek District. A four-man eradication crew was assigned to follow a regular planting crew.

On light areas it was found that those engaged at planting detained the eradicators, but the opposite situation existed when ribes averaged 500 to 700 per acre. The outcome was that each group maintained its normal pace and functioned independently.

A distinct advantage was that eradicators used the same camp and obtained transportation close to the scene of action. The heaviest ribes concentration occurred at the upper limits of the planting site and ordinarily the area would have been reached by foot, thus necessitating approximately two hours' walking time.

ORGANIZATION CHART



F.S.-E.R.A.
Number of Camps - 4
Number of Men - 193

F.S.-REG.
Number of Camps - 3
Number af Men - 96

F.-C.C.C.
Number of Camps - 2
Number of Men - 79

Total Number of Men on Blister Rust Work - 368

It is planned to conduct eradication along with planting when operations are again resumed.

STAND IMPROVEMENT

A pruning project was undertaken in a white pine plantation on the Lower Middle Fork of Big Creek. Blister rust was first discovered there in 1929 and infected trees were prevalent when eradication was started in 1937.

On approximately 70 acres of this plantation the lower limbs were removed to a height equaling two-fifths of the distance from the base of the tree to the top. A total of 316 trees with trunk cankers was destroyed; also, a large number of infected branches were removed.

The area has been thoroughly cleaned of ribes and it is believed to be in a good state of sanitation.

CHECKING

Checking was performed in the same manner as last season. Due to promotions it was necessary to select and train new men for the checking positions.

There was practically no post check performed this past season because of a prolonged fire season.

There were 9,481 acres given a regular check at an average cost of $0.093 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tabulations by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
MONTANA OPERATION

Cooperating Agency	Appropriations	Amount
	Regular	$47,727.74
	ERA	28,807.77
Forest Service	Total	76,535.51
Bureau of Entomology and Plant Quarantine	Regular	2,882.94
Total Expenditures	All Appropriations	$79,418.45

Note:	Regular	ERA	Total
Cabinet	$21,563.46	$13,907.48	$35,470.94
Kootenai	26,164.28	14,900.29	41,064.57

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
MONTANA OPERATION

Item	Forest Service Regular	Forest Service ERA	Forest Service Total	Bureau of Entomology and Plant Quarantine Regular	Total
Salaries, perm. men	$ 3,300.00		$ 3,300.00	$2,700.00	$ 6,000.00
Salaries, temp. men	11,875.99	$ 3,233.89	15,109.88		15,109.88
Wages, temp. laborers	20,594.82	17,274.23	37,869.05		37,869.05
Subsistence supplies	5,971.01	5,926.18	11,897.19		11,897.19
Equipment	4,039.94	214.84	4,254.78		4,254.78
Trucks	226.18	477.05	703.23		703.23
Travel and transp.	1,398.58	899.92	2,298.50	182.94	2,481.44
Chemicals	7.96	113.06	121.02		121.02
Twine	129.60	662.40	792.00		792.00
Other supplies	183.66	6.20	189.86		189.86
Total	$47,727.74	$28,807.77	$76,535.51	$2,882.94	$79,418.45

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES BY PROGRAMS
MONTANA OPERATION

Program	Number Effective Man Days	Expenditures According to Fund		Effective Man Day Cost
Combined FS-ERA FS-Reg.	9,230	FS-Reg.	$45,826.74	$8.36
		FS-ERA	28,807.77	
		EQ-Reg.	2,482.94	
		Total	77,117.45	
CCC	1,055	FS-Reg.	1,901.00	CCC Funds not included
		EQ-Reg.	400.00	
		Total	2,301.00	
Total Cost 1940 Program			$79,418.45	

Number meals served 57,250 Average cost per meal $0.207
Pounds of twine 750 Pounds of chemical 7,000

SUMMARY OF RIBES ERADICATION, 1940
MONTANA OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
									Bushes	Live Stem
Kootenai	Open Reproduction	1,567			1,567	2,723	218,115		2.0	7.9
	Dense Reproduction	202			202	349	16,613		4.1	23.8
	Open Pole	2,546			2,546	576	38,057		1.6	11.7
	Dense Pole	134			134	1			1.2	3.2
	Open Mature	350			350	2	4		.4	7.5
	Dense Mature	280			280	1	19		0	0
	Brush	128			128	1	4		.9	5.6
	All Upland	5,207			5,207	3,653	272,812		1.6	10.1
	Stream (Hand)	450			450	1,471	106,733		3.5	12.6
	All Types	5,657			5,657	5,124	379,545		2.0	10.5
Cebinet	Open Reproduction	754	1,344	295	2,393	2,958	316,614		4.9	26.7
	Open Pole	2,135	77		2,212	225	20,208		2.4	16.0
	Open Meture	823	12		835	686	111,003		4.4	32.4
	All Upland	3,712	1,433	295	5,440	3,869	447,825		4.0	15.9
	Stream (Hand)	100	184	72	356	1,017	135,542			
	Stream (Chemical)	28	33		61	188	11,832	3,944		
	All Stream	100	184	72	356	1,205	147,374		6.7	17.0
	All Types	3,812	1,617	367	5,796	5,074	595,199		4.0	15.9
Savenac Nursery	Open Reproduction		29		29	17	1,356			
	Stream (Hand)		46	96	142	70	4,752			
	All Types		75	96	171	87	6,108			
All Forests	Open Reproduction	2,321	1,373	295	3,989	5,698	536,085		3.6	18.6
	Dense Reproduction	202			202	349	16,613		4.1	23.8
	Open Pole	4,681	77		4,758	801	58,265		1.9	12.9
	Dense Pole	134			134	1			1.2	3.2
	Open Mature	1,173	12		1,185	688	111,007		2.7	21.8
	Dense Mature	280			280	1	19		0	0
	Brush	128			128	1	4		.9	5.6
	All Upland	8,919	1,462	295	10,676	7,539	721,993		2.6	15.6
	Stream (Hand)	550	230	168	948	2,558	247,027			
	Stream (Chemical)	28	33		61	188	11,832	3,944		
	All Stream	550	230	168	948	2,746	258,859		3.7	12.8
	All Types	9,469	1,692	463	11,624	10,285	980,852		2.7	15.3

TABLE NO. 3A - FIRST WORKING

Forest	Eradicetion Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Besis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Spray	Bushes	Live Stam
Kootenei	Open Reproduction	1,567	2,723	218,115		1.74	139		2.0	7.9
	Dense Reproduction	202	349	16,613		1.73	82		4.1	23.8
	Open Pole	2,546	576	38,057		.23	15		1.6	11.7
	Dense Pole	134	1			.01			1.2	3.2
	Open Mature	350	2	4		.01	1		.4	7.5
	Dense Mature	280	1	19		.01	1		0	0
	Brush	128	1	4		.01	1		.9	5.6
	All Uplend	5,207	3,653	272,812		.70	52		1.6	10.1
	Stream (Hand)	450	1,471	106,733		3.27	237		3.5	12.6
	All Types	5,657	5,124	379,545		.91	67		2.0	10.5
Cabinet	Open Reproduction	754	1,356	199,663		1.80	265		4.9	49.5
	Open Pole	2,135	165	14,506		.08	7		2.4	16.0
	Open Meture	823	671	109,547		.82	133		4.4	32.4
	All Upland	3,712	2,192	323,716		.59	87		3.6	29.3
	Stream (Hand)	100	760	116,227		7.60	1,162			
	Stream (Chemicel)	28	28	2,178	726	1.00	78	26		
	All Stream	100	788	118,405		7.88	1,184		6.7	17.0
	All Types	3,812	2,980	442,121		.78	116		3.7	28.9
All Forests	Open Reproduction	2,321	4,079	417,778		1.76	180		3.0	21.7
	Dense Reproduction	202	349	16,613		1.73	82		4.1	23.8
	Open Pole	4,681	741	52,563		.16	11		1.9	12.9
	Dense Pole	134	1			.01			1.2	3.2
	Open Mature	1,173	673	109,551		.57	93		2.7	21.8
	Dense Mature	280	1	19		.01	1		0	0
	Brush	128	1	4		.01	1		.9	5.6
	All Upland	8,919	5,845	596,528		.66	67		2.2	16.0
	Stream (Hand)	550	2,231	222,960		4.06	405			
	Stream (Chemical)	28	28	2,178	726	1.00	78	26		
	All Stream	550	2,259	225,138		4.11	409		3.7	12.8
	All Typee	9,469	8,104	821,666		.86	87		2.4	15.5
TABLE NO. 3B - SECOND WORKING										
Cabinet	Open Reproduction	1,344	1,482	105,157		1.10	78		3.5	10.7
	Open Pole	77	60	5,702		.78	74			
	Open Mature	12	15	1,456		1.25	121			
	All Upland	1,433	1,557	112,315		1.09	78			
	Stream (Hand)	184	217	14,101		1.18	77			
	Stream (Chemicel)	33	160	9,654	3,218	4.85	293	98		
	All Stream	184	377	23,755		2.05	129			
	All Types	1,617	1,934	136,070		1.20	84			
Savenac Nursery	Open Reproduction	29	17	1,356		.59	47			
	Stream (Hand)	46	22	1,624		.48	35			
	All Types	75	39	2,980		.52	40			
All Forests	Open Reproduction	1,373	1,499	106,513		1.09	78			
	Open Pole	77	60	5,702		.78	74			
	Open Mature	12	15	1,456		1.25	121			
	All Upland	1,462	1,574	113,671		1.08	78			
	Stream (Hand)	230	239	15,725		1.04	68			
	Stream (Chemical)	33	160	9,654	3,218	4.85	293	98		
	All Stream	230	399	25,379		1.73	110			
	All Types	1,692	1,973	139,050		1.17	82			
TABLE NO. 3C - THIRD WORKING										
Cabinet	Open Reproduction	295	120	11,794		.41	40		7.8	18.5
	Stream (Hand)	72	40	5,214		.56	72			
	All Types	367	160	17,008		.44	46			
Savenac Nursery	Stream (Hand)	96	48	3,128		.50	33			
All Forests	Open Reproduction	295	120	11,794		.41	40			
	Stream (Hand)	168	88	8,342		.52	50			
	All Types	463	208	20,136		.45	43			

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
MONTANA OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis: Man Days	Per Acre Basis: Ribes	Per Acre Basis: Gallons Sprayed	Ribes Remaining Per Acre: Bushes	Ribes Remaining Per Acre: Live Stem
First	FS-ERA	4,479	4,382	428,764	726	.98	96	26	3.0	24.7
	FS-Reg.	3,121	3,366	352,890		1.08	113		2.5	8.8
	F-CCC	1,869	356	40,012		.19	21		.2	1.1
	Total	9,469	8,104	821,666	726	.86	87		2.4	15.5
Second	FS-ERA	371	556	47,584		1.50	128			
	FS-Reg.	1,082	718	61,616	3,218	.66	57	98	3.3	9.7
	F-CCC	239	699	29,850		2.92	125		4.6	18.9
	Total	1,692	1,973	139,050	3,218	1.17	82		3.5	10.7
Third	FS-ERA	150	68	6,069		.45	40			
	FS-Reg.	313	140	14,067		.45	45		7.8	18.5
	Total	463	208	20,136		.45	43		7.8	18.5
All Workings	FS-ERA	5,000	5,006	482,417	726	1.00	96	26	3.0	24.7
	FS-Reg.	4,516	4,224	428,573	3,218	.94	95	98	3.0	9.7
	F-CCC	2,108	1,055	69,862		.50	33		.5	2.3
	Total	11,624	10,285	980,852	3,944	.88	84	65	2.7	15.3

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
MONTANA OPERATION

Forest	Working	Number of Acres Worked by Forest Service: Forest Service	Private	Total
Kootenai	First	5,580	77	5,657
Cabinet	First	2,293	1,519	3,812
	Second	1,195	422	1,617
	Third	367		367
	Total	3,855	1,941	5,796
Savenac Nursery	Second	49	26	75
	Third	72	24	96
	Total	121	50	171
All Forests	First	7,873	1,596	9,469
	Second	1,244	448	1,692
	Third	439	24	463
	Total	9,556	2,068	11,624

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
MONTANA OPERATION

Forest	Eradication Type	Average Results for All Areas				Areas with More Than 25 Feet Live Stem Per Acre		
		Acres in Checked Area	Acres Checked	Ribes per Acre			Ribes per Acre	
				Bushes	Live Stem	Acres	Bushes	Live Stem
Kootenai	Open Reproduction	1,224	48.26	2.0	7.9	42	25.8	116.5
	Dense Reproduction	168	6.84	4.1	23.8			
	Open Pole	2,623	100.64	1.6	11.7	69	11.1	68.6
	Dense Pole	134	4.04	1.2	3.2			
	Open Mature	350	13.82	.4	7.5			
	Dense Mature	280	6.84	0	0			
	Brush	128	4.68	.9	5.6			
	All Upland	4,907	185.12	1.6	10.1	111	16.7	86.7
	Stream	354	42.82	3.5	12.6	25	30.0	115.0
	All Types	5,261	227.94	2.0	10.5	136	19.1	91.8
Cabinet	Open Reproduction	1,695	64.14	4.9	26.7	72	23.2	122.6
	Open Pole	1,995	40.70	2.4	16.0	101	11.9	85.6
	Open Mature	504	18.62	4.4	32.4	62	15.6	100.8
	All Upland	4,194	123.46	4.0	15.9	235	17.7	105.6
	Stream	26	2.82	6.7	17.0	15	26.7	38.3
	All Types	4,220	126.28	4.0	15.9	250	18.4	100.7
All Forests	Open Reproduction	2,919	112.40	3.6	18.6	114	24.2	120.4
	Dense Reproduction	168	6.84	4.1	23.8			
	Open Pole	4,618	141.34	1.9	12.9	170	11.4	75.7
	Dense Pole	134	4.04	1.2	3.2			
	Open Mature	854	32.44	2.7	21.8	62	15.6	100.8
	Dense Mature	280	6.84	0	0			
	Brush	128	4.68	.9	5.6			
	All Upland	9,101	308.58	2.6	15.6	346	17.3	98.6
	Stream	380	45.64	3.7	12.8	40	28.8	86.3
	All Types	9,481	354.22	2.7	15.3	386	18.7	97.2

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
MONTANA OPERATION

Working	Eradication Type	Acres	Ribes by Species							Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	
First	Open Reproduction	2,321	288,458	128,124	20			1,176		417,778
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	4,681	11,365	31,038		8,384	1,776			52,563
	Dense Pole	134								
	Open Mature	1,173	107,990	1,321	240					109,551
	Dense Mature	280	3					16		19
	Brush	128	4							4
	All Upland	8,919	411,307	173,545	260	8,384	1,776	1,256		596,528
	Stream	550	203,226	6,356	9,913	5,357		286		225,138
	All Types	9,469	614,533	179,901	10,173	13,741	1,776	1,542		821,666
Second	Open Reproduction	1,373	75,402	23,562	4,593	18	347		2,591	106,513
	Open Pole	77	1,674			4,028				5,702
	Open Mature	12	1,456							1,456
	All Upland	1,462	78,532	23,562	4,593	4,046	347		2,591	113,671
	Stream	230	7,947	176	6,744	3,927	21		6,564	25,379
	All Types	1,692	86,479	23,738	11,337	7,973	368		9,155	139,050
Third	Open Reproduction	295	5,461	6,333						11,794
	Stream	168	5,476	20	2,833	13				8,342
	All Types	463	10,937	6,353	2,833	13				20,136
All Workings	Open Reproduction	3,989	369,321	158,019	4,613	18	347	1,176	2,591	536,085
	Dense Reproduction	202	3,487	13,062				64		16,613
	Open Pole	4,758	13,039	31,038		12,412	1,776			58,265
	Dense Pole	134								
	Open Mature	1,185	109,446	1,321	240					111,007
	Dense Mature	280	3					16		19
	Brush	128	4							4
	All Upland	10,676	495,300	203,440	4,853	12,430	2,123	1,256	2,591	721,993
	Stream	948	216,649	6,552	19,490	9,297	21	286	6,564	258,859
	All Types	11,624	711,949	209,992	24,343	21,727	2,144	1,542	9,155	980,852

SUMMARY OF RIBES ERADICATION, 1928-1940
MONTANA OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Forest	Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Kootenai	Open Reproduction	9,552	261		9,813	7,426	950,047	
	Dense Reproduction	2,952	80		3,032	1,357	151,792	
	Open Pole	15,219	779		15,998	7,599	836,364	
	Dense Pole	3,665			3,665	231	15,607	
	Open Mature	7,819			7,819	3,081	433,339	
	Dense Mature	8,608			8,608	458	48,580	
	Brush	235			235	94	7,956	
	Burn	115			115	1	32	
	Meadow-Field	103			103	1		
	All Upland	48,268	1,120		49,388	20,248	2,443,717	
	Stream (Hand)	3,050	533		3,583	8,982	1,277,034	
	All Types	51,318	1,653		52,971	29,230	3,720,751	
Cabinet	Open Reproduction	23,816	2,157	394	26,367	26,542	5,242,716	
	Dense Reproduction	1,612			1,612	438	71,747	
	Open Pole	19,283	438	38	19,759	8,431	1,524,452	
	Dense Pole	2,619	153	12	2,784	966	211,681	
	Open Mature	8,740	12		8,752	4,374	1,057,218	
	Dense Mature	557			557	88	8,566	
	Brush	2,763			2,763	1,895	573,939	
	Meadow-Field	348			348	150	12,131	
	All Upland	59,738	2,760	444	62,942	42,884	8,702,450	
	Stream (Hand)	3,672	709	72	4,453	11,720	2,897,594	
	Stream (Chemical)	465	111		576	1,446	96,327	32,109
	Stream (Slash)	23			23	215	11,500	
	Stream (Machine)	75			75	644	39,500	
	All Stream	3,770	709	72	4,551	14,025	3,044,921	
	All Types	63,508	3,469	516	67,493	56,909	11,747,371	
Savenac Nursery	Open Reproduction	4,692	164		4,856	898	366,968	
	Dense Reproduction	102			102	3		
	All Upland	4,794	164		4,958	901	366,968	
	Stream (Hand)	1,088	962	1,334	3,384	4,126	723,712	
	Stream (Chemical)	239	62		301	880	200,801	36,262
	Stream (Slash)	45		40	85	810	42,500	
	Stream (Machine)		15		15	36	3,000	
	All Stream	1,088	977	1,334	3,399	5,852	970,013	
	All Types	5,882	1,141	1,334	8,357	6,753	1,336,981	
All Forests	Open Reproduction	38,060	2,582	394	41,036	34,866	6,559,731	
	Dense Reproduction	4,666	80		4,746	1,798	223,539	
	Open Pole	34,502	1,217	38	35,757	16,030	2,360,816	
	Dense Pole	6,284	153	12	6,449	1,197	227,288	
	Open Mature	16,559	12		16,571	7,455	1,490,557	
	Dense Mature	9,165			9,165	546	57,146	
	Brush	2,998			2,998	1,989	581,895	
	Burn	115			115	1	32	
	Meadow-Field	451			451	151	12,131	
	All Upland	112,800	4,044	444	117,288	64,033	11,513,135	
	Stream (Hand)	7,810	2,204	1,406	11,420	24,828	4,898,340	
	Stream (Chemical)	704	173		877	2,326	297,128	68,371
	Stream (Slash)	68		40	108	1,025	54,000	
	Stream (Machine)	75	15		90	680	42,500	
	All Stream	7,908	2,219	1,406	11,533	28,859	5,291,968	
	All Types	120,708	6,263	1,850	128,821	92,892	16,805,103	

TABLE NO. 8A - FIRST WORKING

Forest	Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Kootenai	Open Reproduction	9,552	7,262	924,592		.76	97	
	Dense Reproduction	2,952	1,356	151,725		.46	51	
	Open Pole	15,219	6,992	795,874		.46	52	
	Dense Pole	3,665	231	15,607		.06	4	
	Open Mature	7,819	3,081	433,339		.39	55	
	Dense Mature	8,608	458	48,580		.05	6	
	Brush	235	94	7,956		.40	34	
	Burn	115	1	32		.01	1	
	Meadow-Field	103	1			.01		
	All Upland	48,268	19,476	2,377,705		.40	49	
	Stream (Hand)	3,050	8,177	1,214,159		2.58	398	
	All Types	51,318	27,653	3,591,864		.54	70	
Cabinet	Open Reproduction	23,816	23,140	4,833,200		.97	203	
	Dense Reproduction	1,612	438	71,747		.27	45	
	Open Pole	19,283	8,003	1,485,438		.42	77	
	Dense Pole	2,619	901	208,827		.34	80	
	Open Mature	8,740	4,359	1,055,762		.50	121	
	Dense Mature	557	88	8,566		.16	15	
	Brush	2,763	1,895	573,939		.69	208	
	Meadow-Field	348	150	12,131		.43	35	
	All Upland	59,738	38,974	8,249,610		.65	138	
	Stream (Hand)	3,672	10,581	2,804,568		2.88	764	
	Stream (Chemical)	465	1,180	77,079	25,693	2.54	166	55
	Stream (Slash)	23	215	11,500		9.35	500	
	Stream (Machine)	75	644	39,500		8.59	527	
	All Stream	3,770	12,620	2,932,647		3.35	778	
	All Types	63,508	51,594	11,182,257		.81	176	
Savenac Nursery	Open Reproduction	4,692	717	332,932		.15	71	
	Dense Reproduction	102	3			.03		
	All Upland	4,794	720	332,932		.15	69	
	Stream (Hand)	1,088	1,710	372,268		1.57	342	
	Stream (Chemical)	239	777	188,401	32,132	3.25	788	134
	Stream (Slash)	45	168	22,500		3.73	500	
	All Stream	1,088	2,655	583,169		2.44	536	
	All Types	5,882	3,375	916,101		.57	156	
All Forests	Open Reproduction	38,060	31,119	6,090,724		.82	160	
	Dense Reproduction	4,666	1,797	223,472		.39	48	
	Open Pole	34,502	14,995	2,281,312		.43	66	
	Dense Pole	6,284	1,132	224,434		.18	36	
	Open Mature	16,559	7,440	1,489,101		.45	90	
	Dense Mature	9,165	546	57,146		.06	6	
	Brush	2,998	1,989	581,895		.66	194	
	Burn	115	1	32		.01	1	
	Meadow-Field	451	151	12,131		.33	27	
	All Upland	112,800	59,170	10,960,247		.52	97	
	Stream (Hand)	7,810	20,468	4,390,995		2.62	562	
	Stream (Chemical)	704	1,957	265,480	57,825	2.78	377	82
	Stream (Slash)	68	383	34,000		5.63	500	
	Stream (Machine)	75	644	39,500		8.59	527	
	All Stream	7,908	23,452	4,729,975		2.97	598	
	All Types	120,708	82,622	15,690,222		.68	130	

TABLE NO. 8B - SECOND WORKING

Forest	Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Kootenai	Open Reproduction	261	164	25,455		.63	98	
	Dense Reproduction	80	1	67		.01	1	
	Open Pole	779	607	40,490		.78	52	
	All Upland	1,120	772	66,012		.69	59	
	Stream (Hand)	533	805	62,875		1.51	118	
	All Types	1,653	1,577	128,887		.95	78	
Cabinet	Open Reproduction	2,157	2,932	355,387		1.36	165	
	Open Pole	438	333	33,208		.76	76	
	Dense Pole	153	61	2,794		.40	18	
	Open Mature	12	15	1,456		1.25	121	
	All Upland	2,760	3,341	392,845		1.21	142	
	Stream (Hand)	709	1,099	87,812		1.55	124	
	Stream (Chemical)	111	266	19,248	6,416	2.40	173	58
	All Stream	709	1,365	107,060		1.93	151	
	All Types	3,469	4,706	499,905		1.36	144	
Savenac Nursery	Open Reproduction	164	181	34,036		1.10	208	
	Stream (Hand)	962	1,009	294,320		1.05	306	
	Stream (Chemical)	62	103	12,400	4,130	1.66	200	67
	Stream (Machine)	15	36	3,000		2.40	200	
	All Stream	977	1,148	309,720		1.18	317	
	All Types	1,141	1,329	343,756		1.16	301	
All Forests	Open Reproduction	2,582	3,277	414,878		1.27	161	
	Dense Reproduction	80	1	67		.01	1	
	Open Pole	1,217	940	73,698		.77	61	
	Dense Pole	153	61	2,794		.40	18	
	Open Mature	12	15	1,456		1.25	121	
	All Upland	4,044	4,294	492,893		1.06	122	
	Stream (Hand)	2,204	2,913	445,007		1.32	202	
	Stream (Chemical)	173	369	31,648	10,546	2.13	183	61
	Stream (Machine)	15	36	3,000		2.40	200	
	All Stream	2,219	3,318	479,655		1.50	216	
	All Types	6,263	7,612	972,548		1.22	155	

TABLE NO. 8C - THIRD WORKING

Forest	Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Cabinet	Open Reproduction	394	470	54,129		1.19	137	
	Open Pole	38	95	5,806		2.50	153	
	Dense Pole	12	4	60		.33	5	
	All Upland	444	569	59,995		1.28	135	
	Stream (Hand)	72	40	5,214		.56	72	
	All Types	516	609	65,209		1.18	126	
Savenac Nursery	Stream (Hand)	1,334	1,407	57,124		1.05	43	
	Stream (Slash)	40	642	20,000		16.05	500	
	All Stream	1,334	2,049	77,124		1.54	58	
All Forests	Open Reproduction	394	470	54,129		1.19	137	
	Open Pole	38	95	5,806		2.50	153	
	Dense Pole	12	4	60		.33	5	
	All Upland	444	569	59,995		1.28	135	
	Stream (Hand)	1,406	1,447	62,338		1.03	44	
	Stream (Slash)	40	642	20,000		16.05	500	
	All Stream	1,406	2,089	82,338		1.49	59	
	All Types	1,850	2,658	142,333		1.44	77	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1928-1940
MONTANA OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Ribes	Gallons per Sprayed Area
First	EQ-Reg.	1,383	2,315	462,300	30,665	1.67	334	148
	FS-Reg.	8,656	9,565	1,446,312	2,452	1.11	167	54
	EQ-NIRA	21,773	8,027	2,158,067		.37	99	
	FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211	40
	EQ-ERA	42,313	20,386	3,292,671	1,330	.48	78	44
	FS-ERA	10,710	15,783	2,382,840	10,181	1.47	222	90
	F-CCC	13,658	9,757	1,263,790	2,780	.71	93	59
	Total	120,708	82,622	15,690,222	57,825	.68	130	82
Second	EQ-Reg.	619	980	299,410	4,130	1.58	484	67
	FS-Reg.	1,820	1,491	151,306	5,376	.82	83	59
	EQ-ERA	1,342	1,597	265,637		1.19	198	
	FS-ERA	2,080	2,456	202,732	1,040	1.18	97	52
	F-CCC	402	1,088	53,463		2.71	133	
	Total	6,263	7,612	972,548	10,546	1.22	155	61
Third	FS-Reg.	1,052	1,813	77,224		1.72	73	
	EQ-ERA	648	777	59,040		1.20	91	
	FS-ERA	150	68	6,069		.45	40	
	Total	1,850	2,658	142,333		1.44	77	
All Workings	EQ-Reg.	2,002	3,295	761,710	34,795	1.65	380	129
	FS-Reg.	11,528	12,869	1,674,842	7,828	1.12	145	58
	EQ-NIRA	21,773	8,027	2,158,067		.37	99	
	FS-NIRA	22,215	16,789	4,684,242	10,417	.76	211	40
	EQ-ERA	44,303	22,760	3,617,348	1,330	.51	82	44
	FS-ERA	12,940	18,307	2,591,641	11,221	1.41	200	84
	F-CCC	14,060	10,845	1,317,253	2,780	.77	94	59
	Total	128,821	92,892	16,805,103	68,371	.72	130	78

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1928-1940
MONTANA OPERATION

Working	Number of Acres Worked by Ownership Classes: Forest Service	State - Montana	Private	Total
First	100,006	696	20,006	120,708
Second	4,305		1,958	6,263
Third	774		1,076	1,850
All Workings	105,085	696	23,040	128,821

TABLE NO. 11

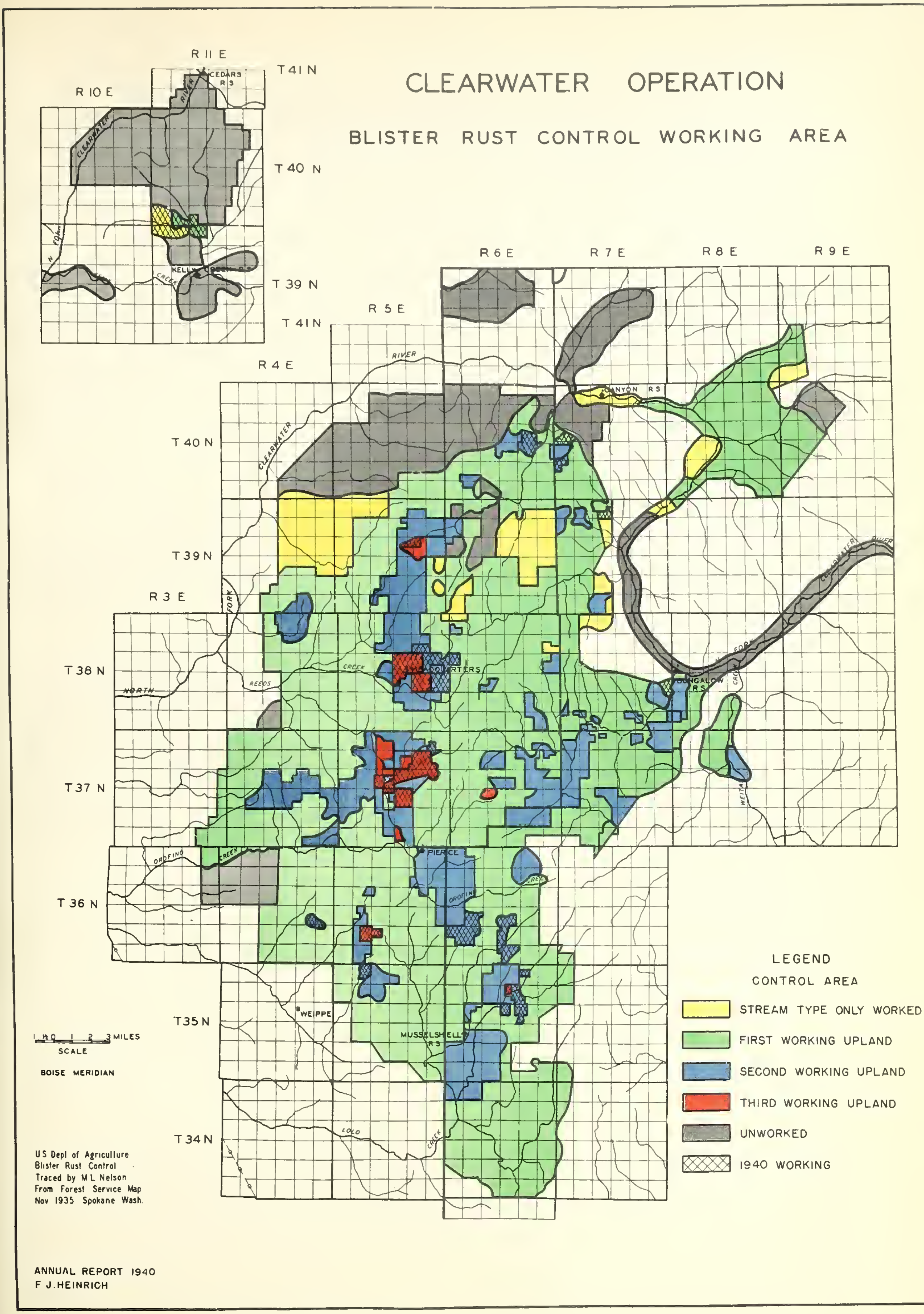
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1928-1940
MONTANA OPERATION

Ownership Class	Number of Acres			Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
	Workad	Unworked	Total		
Forest Service	100,006	49,813	149,819	13,706	163,525
Stata - Montana	696	234	930		930
Privata	20,006	13,789	33,795	2,490	36,285
Total	120,708	63,836	184,544	16,196	200,740

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1928-1940
MONTANA OPERATION

Working	Eradication Typa	Acres	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes coloradense	Ribes triste	Total Ribes
First	Open Raproduction	38,060	2,803,515	3,110,851	4,714	55,569	113,754	1,176	1,145	6,090,724
	Dense Reproduction	4,666	146,302	73,843			1,048	2,279		223,472
	Open Pole	34,502	1,247,964	864,193	200	93,026	75,929			2,281,312
	Dense Pole	6,284	130,061	77,785		8,179	8,409			224,434
	Opan Matura	16,559	1,289,375	172,589	259	11,080	8,729	7,069		1,489,101
	Dense Mature	9,165	52,151	4,807				188		57,146
	Brush	2,998	285,702	285,771		5,260	5,162			581,895
	Burn	115	32							32
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	112,800	5,960,112	4,589,839	5,173	180,235	213,031	10,712	1,145	10,960,247
	Stream	7,908	3,004,551	116,392	266,006	1,284,254	5,744	31,905	21,123	4,729,975
	All Types	120,708	8,964,663	4,706,231	271,179	1,464,489	218,775	42,617	22,268	15,690,222
Second	Open Reproduction	2,582	151,273	240,915	4,860	4,668	10,571		2,591	414,878
	Densa Reproduction	80	63	4						67
	Open Pole	1,217	44,067	22,576		6,134	921			73,698
	Dense Pole	153	801	1,708		285				2,794
	Open Mature	12	1,456							1,456
	All Upland	4,044	197,660	265,203	4,860	11,087	11,492		2,591	492,893
	Stream	2,219	95,926	1,045	41,720	324,083	10,317		6,564	479,655
	All Types	6,263	293,586	266,248	46,580	335,170	21,809		9,155	972,548
Third	Open Reproduction	394	30,594	23,335			200			54,129
	Open Pole	38	800	5,000			6			5,806
	Dense Pole	12		60						60
	All Upland	444	31,394	28,395			206			59,995
	Stream	1,406	7,794	20	13,987	60,537				82,338
	All Typas	1,850	39,188	28,415	13,987	60,537	206			142,333
All Workings	Open Raproduction	41,036	2,985,382	3,375,101	9,574	60,237	124,525	1,176	3,736	6,559,731
	Dense Reproduction	4,746	146,365	73,847			1,048	2,279		223,539
	Open Pola	35,757	1,292,831	891,769	200	99,160	76,856			2,360,816
	Dense Pola	6,449	130,862	79,553		8,464	8,409			227,288
	Open Mature	16,571	1,290,831	172,589	259	11,080	8,729	7,069		1,490,557
	Densa Mature	9,165	52,151	4,807				188		57,146
	Brush	2,998	285,702	285,771		5,260	5,162			581,895
	Burn	115	32							32
	Meadow-Field	451	5,010			7,121				12,131
	All Upland	117,288	6,189,166	4,883,437	10,033	191,322	224,729	10,712	3,736	11,513,135
	Stream	11,533	3,108,271	117,457	321,713	1,668,874	16,061	31,905	27,687	5,291,968
	All Types	128,821	9,297,437	5,000,894	331,746	1,860,196	240,790	42,617	31,423	16,805,103


CLEARWATER OPERATION
BLISTER RUST CONTROL WORKING AREA
R 10 E
R 11 E
T 41 N
T 40 N
T 39 N
CEDARS R S
CLEARWATER
RIVER
KELLY
CREEK
R 3 E
R 4 E
R 5 E
R 6 E
R 7 E
R 8 E
R 9 E
T 41 N
T 40 N
T 39 N
T 38 N
T 37 N
T 36 N
T 35 N
T 34 N
CANYON R S
CLEARWATER
RIVER
FORK
NORTH
REEDS
CREEK
QUARTERS
BUNGALOW R S
WEITAS
PIERCE
OROFINO
CREEK
WEIPPE
MUSSELSHELL R S
LOLO
LEGEND
CONTROL AREA
STREAM TYPE ONLY WORKED
FIRST WORKING UPLAND
SECOND WORKING UPLAND
THIRD WORKING UPLAND
UNWORKED
1940 WORKING
1 1/2 0 1 2 3 MILES
SCALE
BOISE MERIDIAN
US Dept of Agriculture
Blister Rust Control
Traced by M L Nelson
From Forest Service Map
Nov 1935 Spokane Wash.
ANNUAL REPORT 1940
F J. HEINRICH

RIBES ERADICATION, CLEARWATER OPERATION, 1940

By
F. J. Heinrich, Associate Pathologist
David Kyle, Chief Scientific Aid, U. S. Forest Service
H. J. Faulkner, Chief Scientific Aid

INTRODUCTION

The status of white pine blister rust on the Clearwater operation has changed considerably since control work was started in 1929. At that time conditions were favorable for complete control at a nominal cost. Available funds permitted only limited delay measures from 1929 through 1932. By 1933, when large scale control measures were possible through the advent of the CCC program, the rust had reached its eighth year of steady intensification which resulted in its general distribution throughout most of the forest. As a consequence control problems became more difficult, particularly by requiring a much higher standard of efficiency in ribes eradication.

During most of the period from 1933 to 1938, satisfactory progress was made chiefly through the several emergency work programs. A reduction in activities in 1939 and 1940, however, has again delayed orderly progress on the work schedule. This was particularly noticeable during the 1940 season.

ORGANIZATION AND ADMINISTRATION

Field headquarters were established at Pierce, Idaho, on April 29. A warehouse and central supply distributing base were maintained at operation headquarters from which all supplies and equipment were dispatched to camps by truck or pack train. The first camp was established May 6 and all camps were in the field by June 10. The camp working on White Pine Creek closed August 1, and all camps were closed by September 30. Blister rust control personnel of the Bureau of Entomology and Plant Quarantine and the Forest Service worked in close cooperation as in past years.

The camps during the 1940 season included three 66-man ERA camps which were financed and administered by the Bureau of Entomology and Plant Quarantine and five regular funds camps financed and operated by the Forest Service. In addition, there were two 25-man crews from a State CCC camp and 100 men from Forest Service CCC camps. All ERA camps were financed by funds allotted under the Emergency Relief Act. The Forest Service camps were financed by regular appropriations made specifically for blister rust control work. Workers for the ERA camps, other than supervisory personnel, were certified relief men assigned by the Work Projects Administration. These men were about average as compared with those in similar camps in past years.

Men for the Forest Service regular camps were selected and hired through the United States Employment Service. By careful selection these camps were manned by a fine group of efficient and capable workers.

Due to a very serious and prolonged forest fire condition during the past season, the Forest Service regular camps were frequently called for fire suppression duty. Although fire fighting was necessary, it did cause considerable disorganization and time loss from control work.

LOCATION AND DESCRIPTION OF AREAS

With the large amount of logging on state and private lands, it was necessary for ERA camps to work almost entirely on cutover lands. One camp was located at the mouth of Soucie Creek and worked an area on lower White Pine Creek. This camp was discontinued August 1 due to the shortage of men. The other two camps were located on Trail Creek and Upper Deer Creek.

The abundance of dwarf ribes, which usually follow logging operations, caused considerable difficulty on all three camp areas. The cost of removing them is relatively high, but they usually carry considerable infection. This necessitates careful consideration of each area to secure the maximum effectiveness from the crews.

The Forest Service regular camps were located in Greer Gulch, forks of Lolo Creek, North Fork Musselshell Creek, Swanson Creek and Soucie Creek. These camp areas, without exception, consisted of very difficult working conditions. Most of the area was classed as open reproduction which is associated with *Ceanothus sanguineus*, *Ribes lacustre* and *R. viscosissimum*.

For the first time, control work was carried on in the Moose City Basin. The work was done in the Moose Creek drainage by CCC crews from a spike camp located at the mouth of Moose Creek. Considering the amount of chemical eradication done and the fire demands, this camp made good progress. This area supports an excellent stand of young white pine reproduction. Although there is considerable *R. petiolare* and localized infection present, early control work in this area could give complete protection at a reasonable cost.

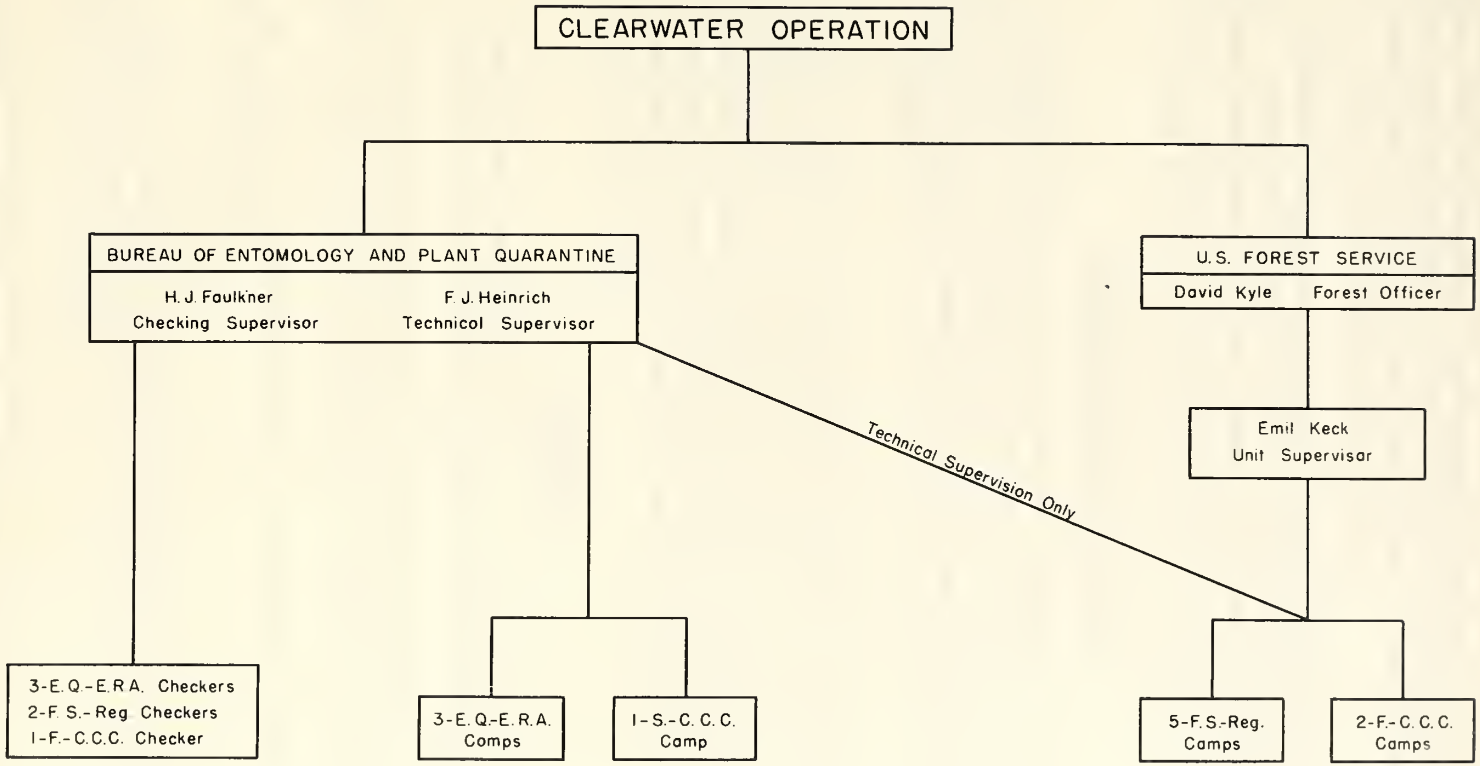
The CCC camp at Bungalow Ranger Station worked an area between the forks of Orogrande Creek and the North Fork of the Clearwater River. The working conditions were very difficult due to the ruggedness of terrain and the density of brush.

The State CCC camp worked area on Heywood Creek, Grasshopper Creek and the Battles burn. The crews covered considerable ground, but the efficiency was relatively low.

METHODS AND EQUIPMENT

Count lines or cross strings at five or ten chain intervals were used in some of the camps in laying out crew work. The primary object of this method is to secure a crew count at frequent intervals in order to record data on a smaller unit of area than the one commonly used of 40 acres or more. The units used were two and one-half and ten acres in size.

ORGANIZATION CHART



E.Q.-E.R.A.
Number af Camps - 3
Number af Men - 297

S.-C. C. C.
Number af Camps - 1
Number of Men - 62

F. S.-REG.
Number of Camps - 5
Number of Men - 166

F.-C. C. C.
Number af Camps - 2
Number of Men - 106

Total Number of Men on Blister Rust Work - 631

1940

Results include the beneficial psychological effect on the men from working short strips, aid in planning rework and future work. It is believed that the benefits from these smaller crew divisions will more than compensate for the additional cost in laying the count lines. Data taken thus far are insufficient to definitely establish this method.

Eye tests were given nearly all men working in the ERA and regular funds camps. These showed that a small percentage had such poor eyesight that they were unable to do field work. The eyesight ratings were taken into consideration in arranging and placing crews on specific areas. It is believed that giving eye tests to our field men is a sound practice.

PREERADICATION AND SURVEYS

Stocking surveys were carried on throughout the summer and fall on questionable areas to determine the amount of white pine present. This work was carried along in conjunction with regular field work during the summer. During the fall after all camps were closed the Forest Service camp bosses were used for approximately one month and continued the surveys.

There is a particular need for survey information in planning the work on cutover lands since approximately 50 per cent of this type is being left with such a heavy stand of mixed species or lack of seed source that a new crop of white pine is impossible. A rather large acreage of white pine type will lose this classification following logging and remain non-white pine producing until some silvicultural change restores it to pine producing status. Consequently, these areas will be eliminated from area under consideration for control work.

CHECKING

Checking was continued during the 1940 season with only minor changes in methods and policies over those used during the 1939 season.

The checker-flanker method of ribes eradication on areas of light ribes population was used on an experimental basis to determine its use and limitations. Results will be covered in a separate report.

The regular checking organization covered 8,863 acres at an average cost of $0.101 per acre.

A post check was run on 5,520 acres of cutover lands. Four milacre plots were taken at the end of each chain transect to determine the amount and distribution of western white pine. Ribes counts were taken on a continuous strip, 30 feet in width.

Post checks and disease surveys were run simultaneously on areas where both were needed. Checkers worked in conjunction with disease survey men, searching for ribes and aiding in classifying and recording ribes and canker data. The combining of these two surveys resulted in securing better

information at a reduction in cost and was also valuable training for the checking personnel in recognizing and classifying infection in its various stages.

The average cost for all post check was $0.064 per acre.

A two per cent advance survey was run on 6,500 acres of unworked areas on Moose and Independence Creek drainages in the Moose City Basin. Both stocking counts for western white pine and ribes data were recorded. This information will be used for planning future work on this area. The average per acre cost for this survey was $0.042.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
CLEARWATER OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 66,360.46
	ERA	693.00
	Total	67,053.46
Bureau of Entomology and Plant Quarantine	Regular	6,785.95
	ERA	62,858.82
	Total	69,644.77
Total Expenditures	All Appropriations	$136,698.23

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
CLEARWATER OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine			Total
	Regular	ERA	Total	Regular	ERA	Total	
Salaries, perm. men	$ 1,300.00		$ 1,300.00	$5,991.66		$ 5,991.66	$ 7,291.66
Salaries, temp. men	13,626.09		13,626.09		$ 6,416.99	6,416.99	20,043.08
Wages, temp. laborers	37,077.17	$693.00	37,770.17	632.20	40,218.74	40,850.94	78,621.11
Subsistence supplies	9,943.27		9,943.27	162.09	12,255.94	12,418.03	22,361.30
Equipment	1,141.13		1,141.13		679.89	679.89	1,821.02
Trucks	1,070.57		1,070.57				1,070.57
Travel and transp.	1,878.18		1,878.18		1,602.63	1,602.63	3,480.81
Twine	216.00		216.00				216.00
Other Supplies	108.05		108.05		1,684.63	1,684.63	1,792.68
Total	$66,360.46	$693.00	$67,053.46	$6,785.95	$62,858.82	$69,644.77	$136,698.23

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
CLEARWATER OPERATION

Program	Number Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
EQ-ERA	10,469	EQ-ERA	$ 62,858.82	$6.46
		EQ-Reg.	4,775.95	
		Total	67,634.77	
FS-Reg.	8,228	FS-Reg.	62,030.39	7.71
		FS-ERA	347.00	
		EQ-Reg.	1,080.00	
		Total	63,457.39	
CCC	3,407	FS-Reg.	3,116.72	CCC Funds Not Included
		FS-ERA	346.00	
		EQ-Reg.	930.00	
		Total	4,392.72	
Pine Disease Survey		FS-Reg.	1,213.35	
Total Cost 1940 Program			$136,698.23	

	Forest Service	Bureau
Number of meals served	72,495	70,255
Average cost per meal	$.178	$.168
Pounds of chemical used	4,410	2,247
Pounds of twine used	2,117	2,689

SUMMARY OF RIBES ERADICATION, 1940
CLEARWATER OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray	Ribes Remaining Per Acre	
								Bushes	Live Stem
Open Reproduction	1,098	4,097	777	5,972	10,225	1,027,471		7.0	19.8
Open Pole	236			236				0	0
Cutover		4,374	3,481	7,855	10,316	3,020,389		13.6	26.2
Burn		192		192	353	323,918		50.0	64.4
All Upland	1,334	8,663	4,258	14,255	20,894	4,371,778		10.7	23.4
Stream (Hand)	229	41		270	674	94,672		7.0	45.5
Stream (Chemical)	194	3	110	307	536	19,710	6,570	0	0
All Stream	229	41		270	1,210	114,382		7.0	45.5
All Types	1,563	8,704	4,258	14,525	22,104	4,486,160		10.5	25.1

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
					Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	1,098	2,718	285,551		2.48	260		11.1	38.9
Open Pole	236							0	0
All Upland	1,334	2,718	285,551		2.04	214			
Stream (Hand)	229	575	76,389		2.51	334			
Stream (Chemical)	194	402	13,230	4,410	2.07	68	23	5.4	39.9
All Stream	229	977	89,619		4.27	391		5.4	39.9
All Types	1,563	3,695	375,170		2.36	240		6.8	36.4

TABLE NO. 3B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	4,097	7,102	674,502		1.73	165		5.3	12.7
Cutover	4,374	5,705	2,372,004		1.30	542		15.5	27.5
Burn	192	353	323,918		1.84	1,687		50.0	64.4
All Upland	8,663	13,160	3,370,424		1.52	389		10.8	20.7
Stream (Hand)	41	99	18,283		2.41	446		0	0
Stream (Chemical)	3	3	150	50	1.00	50	17	0	0
All Stream	41	102	18,433		2.49	450		0	0
All Types	8,704	13,262	3,388,857		1.52	389		10.8	20.7

TABLE NO. 3C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	777	405	67,418		.52	87		9.8	30.9
Cutover	3,481	4,611	648,385		1.32	186		10.3	23.9
All Upland	4,258	5,016	715,803		1.18	168			
Stream (Chemical)	110	131	6,330	2,110	1.19	58	19	31.9	133.8
All Types	4,258	5,147	722,133		1.21	170		11.2	29.2

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
CLEARWATER OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	FS-Reg.	428	1,416	171,470		3.31	401		18.9	66.3
	F-CCC	1,135	2,279	203,700	4,410	2.01	179	23	4.0	29.3
	Total	1,563	3,695	375,170	4,410	2.36	240			
Second	EQ-ERA	4,391	6,285	2,602,563	50	1.43	593	17	16.7	30.4
	FS-Reg.	3,893	6,604	776,846		1.70	200		3.5	8.7
	S-CCC	420	373	9,448		.89	22			
	Total	8,704	13,262	3,388,857	50	1.52	389			
Third	EQ-ERA	3,498	4,184	539,750	2,110	1.20	154	19	11.4	30.7
	FS-Reg.	280	208	33,010		.74	118		2.7	5.3
	S-CCC	480	755	149,373		1.57	311			
	Total	4,258	5,147	722,133	2,110	1.21	170			
All Workings	EQ-ERA	7,889	10,469	3,142,313	2,160	1.33	398	19	14.4	30.5
	FS-Reg.	4,601	8,228	981,326		1.79	213		4.7	13.1
	F-CCC	1,135	2,279	203,700	4,410	2.01	179	23	5.4	28.0
	S-CCC	900	1,128	158,821		1.25	176			
	Total	14,525	22,104	4,486,160	6,570	1.52	309		10.5	25.1

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
CLEARWATER OPERATION

State	Working	Number of Acres Worked								
		By Forest Service		By Bureeu of Entomology and Plant Quarantine			Totel			
		Federel Forest Service	Private	Forest Service	Stete	Private	Federal Forest Service	State	Privete	Totel
Idaho	First	1,563					1,563			1,563
	Second	3,818	75		1,395	3,416	3,818	1,395	3,491	8,704
	Third	280		255	523	3,200	535	523	3,200	4,258
	Totel	5,661	75	255	1,918	6,616	5,916	1,918	6,691	14,525

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
CLEARWATER OPERATION

Eradicetion Type	Average Results for All Arees				Areas With More Than 25 Feet Live Stem Per Acre		
	Acres in Checked Area	Acres Checked	Ribes Per Acre		Acres	Ribes Per Acre	
			Bushes	Live Stem		Bushes	Live Stem
Open Reproduction	4,040	152.8	7.0	19.8	627	24.0	76.5
Open Pole	84	3.3	0	0		0	0
Cutover	4,471	162.5	13.6	26.2	1,622	26.8	48.9
Brush	42	1.6	55.0	76.3	42	55.0	76.3
Burn	70	1.6	50.0	64.4	70	50.0	64.4
All Upland	8,707	321.8	10.7	23.4	2,361	27.1	57.6
Stream	156	26.6	7.0	45.5	156	7.0	45.5
All Types	8,863	348.4	10.5	25.1	2,517	21.8	54.4

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lecustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Open Reproduction	1,098	93,010	192,541				285,551
	Open Pole	236						
	All Upland	1,334	93,010	192,541				285,551
	Stream	229	76,389		13,230			89,619
	All Types	1,563	169,399	192,541	13,230			375,170
Second	Open Reproduction	4,097	57,033	612,751	4,682		36	674,502
	Cutover	4,374	116,515	2,235,056	19,732	616	85	2,372,004
	Burn	192	3,089	320,829				323,918
	All Upland	8,663	176,637	3,168,636	24,414	616	121	3,370,424
	Stream	41	9,389	2,074	6,970			18,433
	All Types	8,704	186,026	3,170,710	31,384	616	121	3,388,857
Third	Open Reproduction	777	3,603	63,620	195			67,418
	Cutover	3,481	70,507	565,604	12,131		143	648,385
	All Upland	4,258	74,110	629,224	12,326		143	715,803
	Stream	110			6,330			6,330
	All Types	4,258	74,110	629,224	18,656		143	722,133
All Workings	Open Reproduction	5,972	153,646	868,912	4,877		36	1,027,471
	Open Pole	236						
	Cutover	7,855	187,022	2,800,660	31,863	616	228	3,020,389
	Burn	192	3,089	320,829				323,918
	All Upland	14,255	343,757	3,990,401	36,740	616	264	4,371,778
	Stream	270	85,778	2,074	26,530			114,382
	All Types	14,525	429,535	3,992,475	63,270	616	264	4,486,160

SUMMARY OF RIBES ERADICATION, 1929-1940
CLEARWATER OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallons Spray
Open Reproduction	58,371	16,484	1,717	76,572	123,566	34,699,898	
Dense Reproduction	11,088	493		11,581	5,286	1,164,891	
Open Pole	25,677	11,284		36,961	21,382	4,527,630	
Dense Pole	3,534	1,569		5,103	1,553	292,973	
Open Mature	213,980	15,743		229,723	107,122	24,099,942	
Dense Mature	5,309	324		5,633	559	134,244	
Cutover	27,726	29,805	4,779	62,310	61,987	20,809,011	
Brush	2,795	79		2,874	2,578	732,633	
Burn	1,045	432		1,477	1,777	1,285,330	
Subalpine	122			122	118	53,948	
Meadow-Field	1,890			1,890			
All Upland	351,537	76,213	6,496	434,246	325,928	87,800,500	
Stream (Hand)	41,606	21,727	2,174	65,507	62,639	14,002,260	
Stream (Chemical)	14,430	5,510	498	20,438	38,062	2,655,621	885,007
Stream (Slash)	65	13		78	1,258	188,983	
Stream (Zone)		1,666		1,666	1,129	280,094	
All Stream	41,671	23,406	2,174	67,251	103,088	17,126,958	
All Types	393,208	99,619	8,670	501,497	429,016	104,927,458	

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Open Reproduction	58,371	98,897	31,935,573		1.69	547	
Dense Reproduction	11,088	5,214	1,161,593		.47	105	
Open Pole	25,677	15,201	3,600,567		.59	140	
Dense Pole	3,534	937	185,062		.27	52	
Open Mature	213,980	99,387	23,291,483		.46	109	
Dense Mature	5,309	493	130,871		.09	25	
Cutover	27,726	25,888	10,610,089		.93	383	
Brush	2,795	2,536	729,247		.91	261	
Burn	1,045	1,246	917,609		1.19	878	
Subalpine	122	118	53,948		.97	442	
Meadow-Field	1,890						
All Upland	351,537	249,917	72,616,042		.71	207	
Stream (Hand)	41,606	43,841	11,105,816		1.05	267	
Stream (Chemical)	14,430	30,055	2,300,855	766,685	2.08	159	53
Stream (Slash)	65	1,233	188,983		18.96	2,907	
All Stream	41,671	75,129	13,595,654		1.80	326	
All Types	393,208	325,046	86,211,696		.83	219	

TABLE NO. 8B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Open Reproduction	16,484	22,508	2,558,176		1.37	155	
Dense Reproduction	493	72	3,298		.15	7	
Open Pole	11,284	6,181	927,063		.55	82	
Dense Pole	1,569	616	107,911		.39	69	
Open Mature	15,743	7,735	808,459		.49	51	
Dense Mature	324	66	3,373		.20	10	
Cutover	29,805	30,610	9,507,715		1.03	319	
Brush	79	42	3,386		.53	43	
Burn	432	531	367,721		1.23	851	
All Upland	76,213	68,361	14,287,102		.90	187	
Stream (Hand)	21,727	17,194	2,661,081		.79	122	
Stream (Chemical)	5,510	7,653	340,093	113,431	1.39	62	21
Stream (Slash)	13	25			1.92		
Stream (Zone)	1,666	1,129	280,094		.68	168	
All Stream	23,406	26,001	3,281,268		1.11	140	
All Types	99,619	94,362	17,568,370		.95	176	

TABLE NO. 8C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallons Spray
Open Reproduction	1,717	2,161	206,149		1.26	120	
Cutover	4,779	5,489	691,207		1.15	145	
All Upland	6,496	7,650	897,356		1.18	138	
Stream (Hand)	2,174	1,604	235,363		.74	108	
Stream (Chemical)	498	354	14,673	4,891	.71	29	10
All Stream	2,174	1,958	250,036		.90	115	
All Types	8,670	9,608	1,147,392		1.11	132	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1940
CLEARWATER OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis: Man Days	Per Acre Basis: Ribes	Per Acre Basis: Gallons Per Sprayed Area
First	FS-Reg.	11,303	17,065	6,328,090	18,060	1.51	560	72
	EQ-NIRA	19,009	12,345	5,679,694	13,361	.65	299	69
	FS-NIRA	41,460	33,021	12,605,276	11,694	.80	304	79
	EQ-ERA	62,640	60,861	14,881,129	75,622	.97	238	77
	FS-ERA	2,503	3,769	1,427,903		1.51	570	
	Cooperative	91,453	59,665	18,267,124	283,158	.65	200	36
	F-CCC	66,494	61,846	12,935,834	153,039	.93	195	59
	S&P-CCC	98,346	76,474	14,086,646	211,751	.78	143	87
	Total	393,208	325,046	86,211,696	766,685	.83	219	53
Second	FS-Reg.	17,559	15,491	2,435,601	6,936	.88	139	26
	EQ-NIRA	1,076	660	159,890	3,355	.61	149	45
	FS-NIRA	2,498	2,342	175,212	8,007	.94	70	21
	EQ-ERA	45,521	44,401	8,942,015	42,399	.98	196	28
	FS-ERA	8,249	5,184	514,730	2,044	.63	62	27
	Cooperative	4,843	2,898	553,110	10,553	.60	113	3
	F-CCC	10,415	12,155	1,476,068	18,003	1.17	142	41
	S&P-CCC	9,458	11,231	3,311,744	22,134	1.19	350	19
	Total	99,619	94,362	17,568,370	113,431	.95	176	15
Third	FS-Reg.	726	556	64,553		.77	89	
	FS-NIRA	914	747	127,700	1,922	.82	140	30
	EQ-ERA	5,286	6,353	673,159	2,110	1.20	127	19
	FS-ERA	284	319	44,201	348	1.12	156	3
	F-CCC	683	778	73,959	511	1.14	108	2
	S&P-CCC	777	855	163,820		1.10	211	
	Total	8,670	9,608	1,147,392	4,891	1.11	132	9
All Workings	FS-Reg.	29,588	33,112	8,828,244	24,996	1.12	298	49
	EQ-NIRA	20,085	13,005	5,839,584	16,716	.65	291	62
	FS-NIRA	44,872	36,110	12,908,188	21,623	.80	288	36
	EQ-ERA	113,447	111,615	24,496,303	120,131	.98	216	46
	FS-ERA	11,036	9,272	1,986,834	2,392	.84	180	13
	Cooperative	96,296	62,563	18,820,234	293,711	.65	195	26
	F-CCC	77,592	74,779	14,485,861	171,553	.96	187	53
	S&P-CCC	108,581	88,560	17,562,210	233,885	.82	162	66
	Total	501,497	429,016	104,927,458	885,007	.86	209	40

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1940
CLEARWATER OPERATION

Working	Number of Acres Worked by Ownership Classes					Total
	Federal					
	Forest Service	Public Domain	Total	State - Idaho	Private	
First	148,094	3,680	151,774	78,834	162,600	393,208
Second	44,200	628	44,828	14,618	40,173	99,619
Third	2,773	12	2,785	883	5,002	8,670
All Workings	195,067	4,320	199,387	94,335	207,775	501,497

TABLE NO. 11

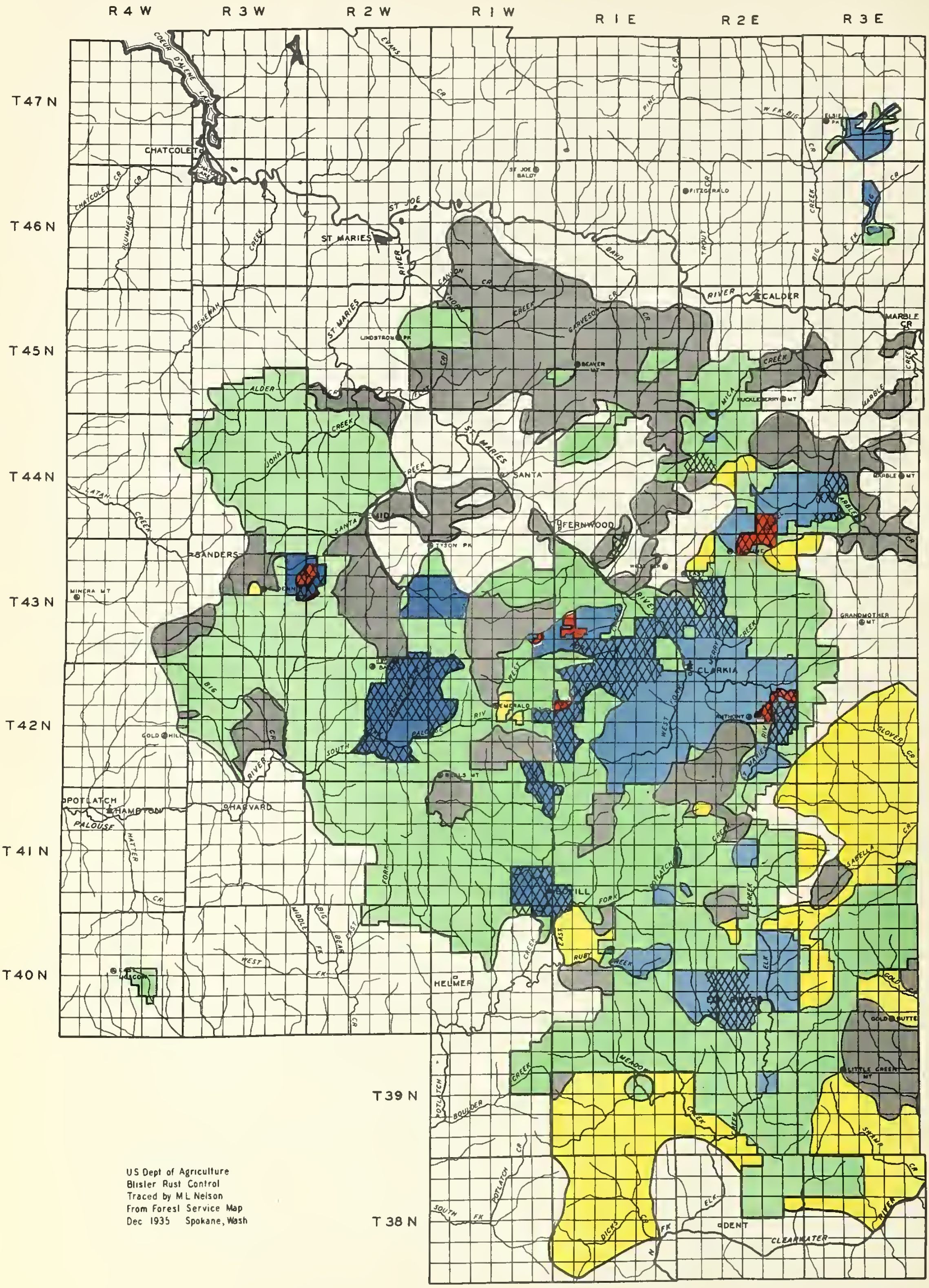
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1940
CLEARWATER OPERATION

Ownership Class	Number of Acres: Worked	Number of Acres: Unworked	Number of Acres: Total	Acres Mature Stands on Which Working is Deferred	Total Acres White Pine
Forest Service	148,094	47,776	195,870	8,360	204,730
Public Domain	3,680	350	4,030		4,030
Subtotal Federal	151,774	48,126	199,900	8,860	208,760
State	78,834	2,956	81,790	11,200	92,990
Private	162,600	17,710	180,310	27,940	208,250
Total	393,208	68,792	462,000	48,000	510,000

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1929-1940
CLEARWATER OPERATION

Working	Eradication Type	Acres	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	Total Ribes
First	Open Reproduction	58,371	7,571,888	24,133,032	73,506	41,600	115,547		31,935,573
	Dense Reproduction	11,088	157,346	980,480	2,457	5,726	15,584		1,161,593
	Open Pole	25,677	2,340,591	1,221,117	31,301	6	7,090	462	3,600,567
	Dense Pole	3,534	127,043	57,703	316				185,062
	Open Mature	213,980	16,156,577	6,773,065	197,117	107,057	57,641	26	23,291,483
	Dense Mature	5,309	104,873	22,438	715	865	1,980		130,871
	Cutover	27,726	2,100,601	8,431,923	38,603	27,752	11,210		10,610,089
	Brush	2,795	210,516	490,931	17,270	114	10,416		729,247
	Burn	1,045	74,796	838,377	568		3,868		917,609
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	351,537	28,897,731	42,949,514	361,853	183,120	223,336	488	72,616,042
	Stream	41,671	9,861,025	324,255	2,683,146	701,834	25,394		13,595,654
	All Types	393,208	38,758,756	43,273,769	3,044,999	884,954	248,730	488	86,211,696
Second	Open Reproduction	16,484	503,183	2,043,852	11,101	4	36		2,558,176
	Dense Reproduction	493	102	3,192	4				3,298
	Open Pole	11,284	395,523	518,636	12,653	1	250		927,063
	Dense Pole	1,569	101,801	2,734	3,376				107,911
	Open Mature	15,743	392,150	400,158	15,768	116		267	808,459
	Dense Mature	324	3,058	315					3,373
	Cutover	29,805	1,087,641	8,345,143	66,732	724	7,475		9,507,715
	Brush	79	424	2,962					3,386
	Burn	432	19,437	342,837	5,447				367,721
	All Upland	76,213	2,503,319	11,659,829	115,081	845	7,761	267	14,287,102
	Stream	23,406	1,865,403	516,470	806,862	76,716	9,141	6,676	3,281,268
	All Types	99,619	4,368,722	12,176,299	921,943	77,561	16,902	6,943	17,568,370
Third	Open Reproduction	1,717	111,033	93,238	1,878				206,149
	Cutover	4,779	91,007	585,922	14,135		143		691,207
	All Upland	6,496	202,040	679,160	16,013		143		897,356
	Stream	2,174	178,214	2,038	46,968	22,816			250,036
	All Types	8,670	380,254	681,198	62,981	22,816	143		1,147,392
All Workings	Open Reproduction	76,572	8,186,104	26,270,122	86,485	41,604	115,583		34,699,898
	Dense Reproduction	11,581	157,448	983,672	2,461	5,726	15,584		1,164,891
	Open Pole	36,961	2,736,114	1,739,753	43,954	7	7,340	462	4,527,630
	Dense Pole	5,103	228,844	60,437	3,692				292,973
	Open Mature	229,723	16,548,727	7,173,223	212,885	107,173	57,641	293	24,099,942
	Dense Mature	5,633	107,931	22,753	715	865	1,980		134,244
	Cutover	62,310	3,279,249	17,362,988	119,470	28,476	18,828		20,809,011
	Brush	2,874	210,940	493,893	17,270	114	10,416		732,633
	Burn	1,477	94,233	1,181,214	6,015		3,868		1,285,330
	Subalpine	122	53,500	448					53,948
	Meadow-Field	1,890							
	All Upland	434,246	31,603,090	55,288,503	492,947	183,965	231,240	755	87,800,500
	Stream	67,251	11,904,642	842,763	3,536,976	801,366	34,535	6,676	17,126,958
	All Types	501,497	43,507,732	56,131,266	4,029,923	985,331	265,775	7,431	104,927,458



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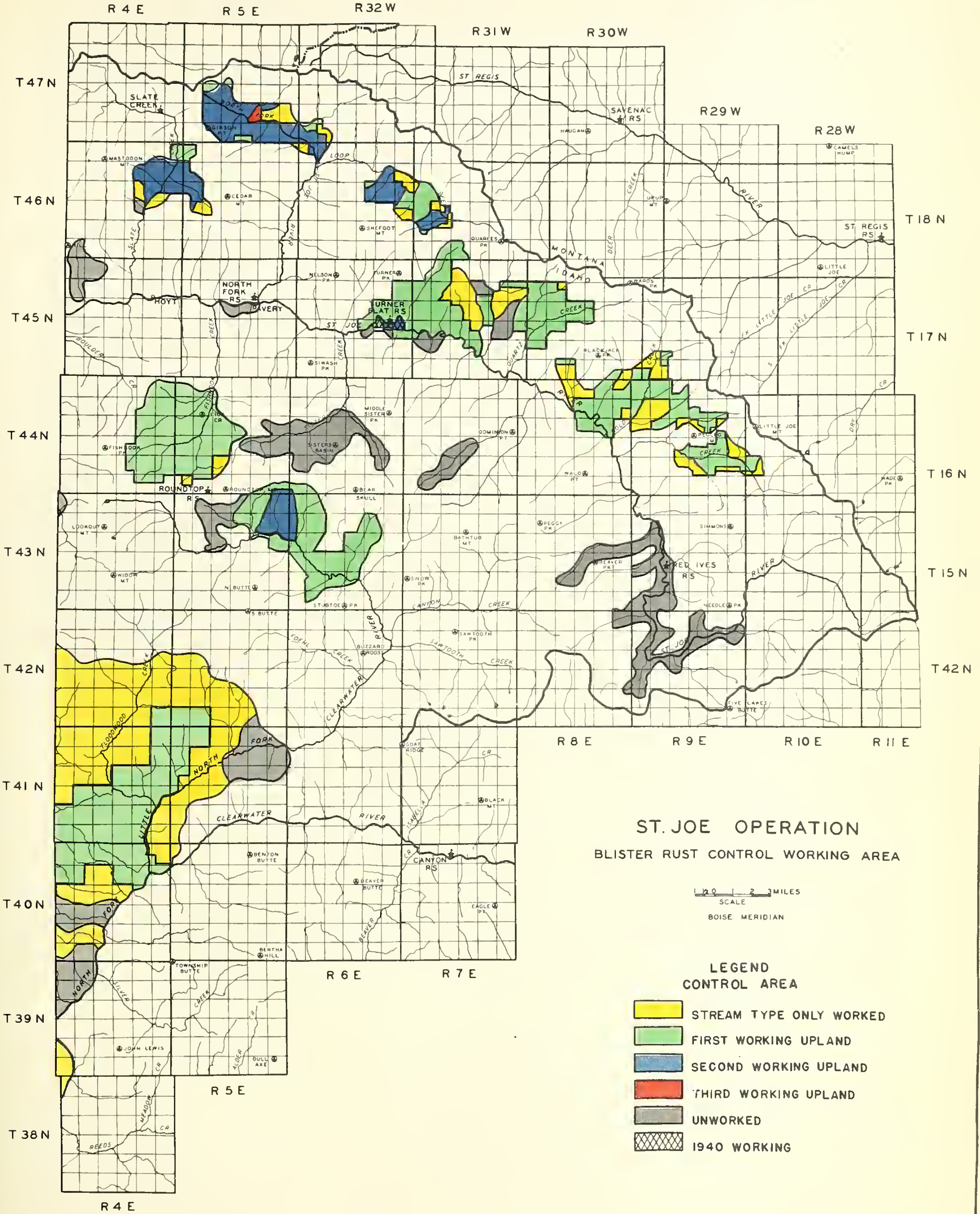
ST. JOE OPERATION
BLISTER RUST CONTROL WORKING AREA
SCALE
BOISE MERIDIAN
LEGEND
CONTROL AREA
STREAM TYPE ONLY WORKED
FIRST WORKING UPLAND
SECOND WORKING UPLAND
THIRD WORKING UPLAND
UNWORKED
1940 WORKING
R 4 E
R 5 E
R 32 W
R 31 W
R 30 W
R 29 W
R 28 W
R 6 E
R 7 E
R 8 E
R 9 E
R 10 E
R 11 E
T 47 N
T 46 N
T 45 N
T 44 N
T 43 N
T 42 N
T 41 N
T 40 N
T 39 N
T 38 N
T 18 N
T 17 N
T 16 N
T 15 N
SLATE CREEK
SAVENAC RS
ST REGIS RS
NORTH FORK RS
HOYT
AVERY
TURNER FLAT RS
ROUNDTOP RS
RED IVES RS
CANYON RS
MONTANA
IDAHO
ST REGIS
ST JOE
CLEARWATER
RIVER

RIBES ERADICATION, ST. JOE OPERATION, 1940

By
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INTRODUCTION

Blister rust control work was continued on the St. Joe operation for the twelfth consecutive year. To date 530,832 acres of high priority white pine stands have been given initial ribes eradication. Second working has been performed on 105,475 acres, and third working has been given 9,616 acres. Third working has been confined chiefly to stream type. There remain 263,633 acres of young growth white pine needing immediate consideration. In addition, there are 90,460 acres of mature timber which will not require any ribes eradication until the areas are logged.

Control work on the St. Joe operation was continued by three classes of camps during the 1940 season. Four 66-man ERA camps, financed by the Division of Plant Disease Control, began field work in May and continued through September. Twelve 33-man and two 66-man camps financed by regular Forest Service funds operated for the average period of June 1 to September 15. The majority of the enrollees in the permanent CCC camps on the St. Joe National Forest were employed on blister rust control work for the average period of May 15 to September 30. Ribes eradication work was carried on directly from three CCC main camps and in addition a spike camp was established for blister rust control work.

ORGANIZATION AND ADMINISTRATION

The control work was organized and administered according to the cooperative working plan. Full responsibility for the administration of the regular Forest Service camps and the supervision of the field work for the CCC camps was assumed by the Forest Service. The Division of Plant Disease Control administered the technical supervision for all Forest Service regular and CCC camps, and operated and supervised all ERA camps. A checking supervisor from the Division of Plant Disease Control was in charge of the checking activities for all camps administered by both agencies. See the accompanying organization chart for details.

The field headquarters at Clarkia, Idaho, maintained by the Division of Plant Disease Control, was used as an operating base for all Bureau activities and some Forest Service activities. The Forest Service field headquarters and supply base were maintained at the Clarkia Ranger Station, Clarkia, Idaho. To free the Forest Service field supervisory personnel from the constantly increasing volume of paper work and to permit full time supervision of the crews in the field, a Forest Officer and a field clerk stationed at the Clarkia Ranger Station handled all routine paper work pertaining to reports, records, appointments and employment. This arrangement proved very satisfactory for a large scale operation.

The CCC spike camp was operated on the same basis as in 1939. Subsistence was furnished by the Forest Service and the supervisory cook in the camp was paid from Forest Service funds. The Army refunded to the Forest Service the amount equal to the CCC ration allowance for payment of subsistence.

The only men employed in the ERA camps were those assigned by the Idaho Division of Employment, Work Projects Administration.

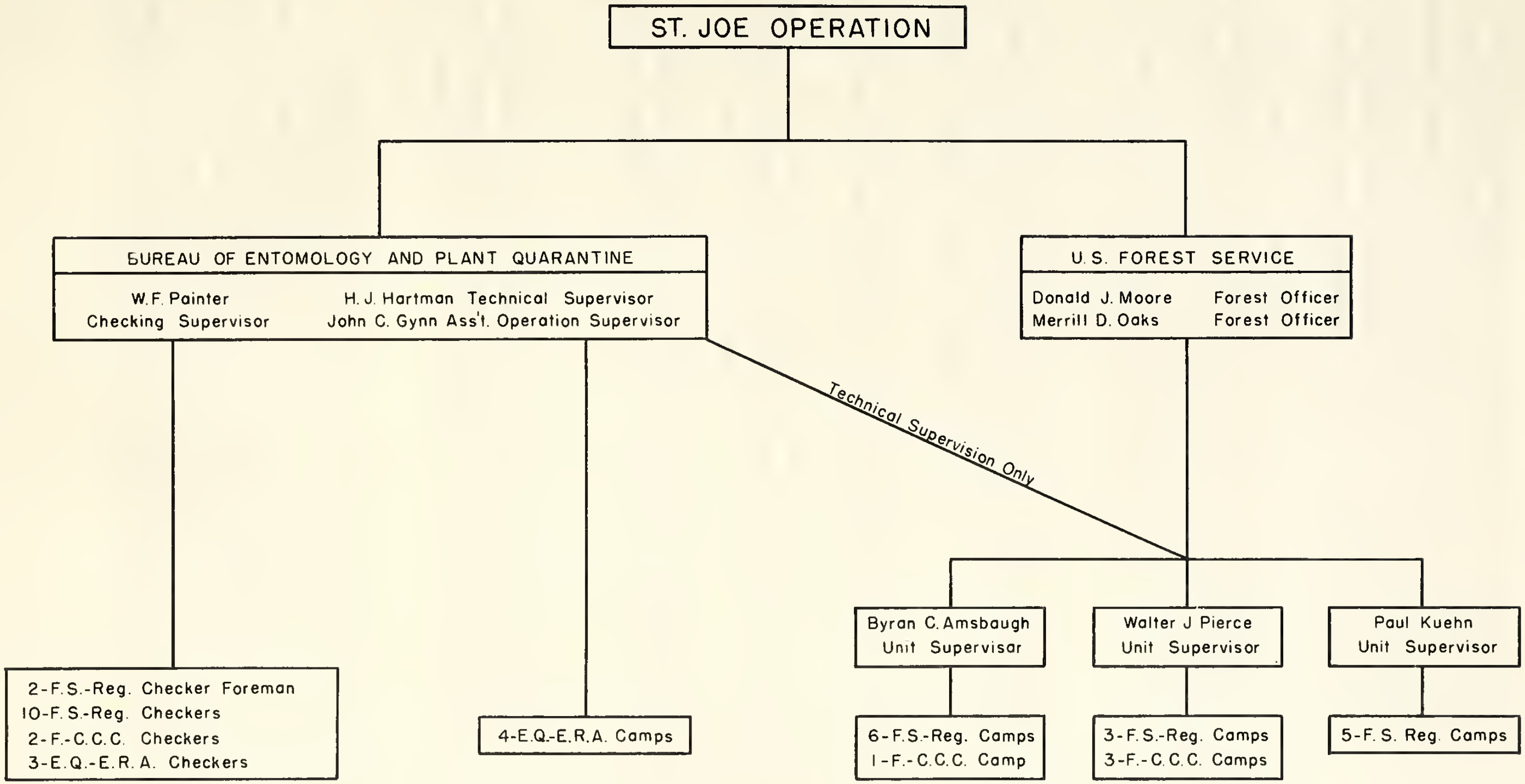
To provide and maintain the best available class of labor in the Forest Service regular camps, all former employees whose services were satisfactory during the past three years were sent application forms. Applicants available from this group were selected by name either directly or through the State Employment Service. Inexperienced men were obtained from applicants interviewed by responsible members of the operation or from local communities through a designated member of each community. About fifty forestry students were employed. This employment policy proved to be very satisfactory for the first half of the season and made available throughout the season a better class of labor than was employed in 1939. As the 1940 season progressed, the labor turnover increased and the quality of available labor greatly decreased. Many outstanding crew leaders and laborers were transferred to ranger districts of the St. Joe National Forest for fire guard and lookout duty. These men were replaced in the blister rust control camps with unsatisfactory inexperienced labor. This practice caused a reduction in the quality and quantity of work and lowered the morale of the camp bosses. Material for crew leaders and for future supervisory positions was noticeably lacking. The labor turnover, amounting to more than 100 per cent, caused a great amount of added expense and lost motion.

During July, August and early September many blister rust camps were engaged in fire suppression work. Blister rust control personnel forms a very valuable first line of defense in fire suppression work.

LOCATION AND DESCRIPTION OF AREAS

The blister rust control policy called for the concentration of all efforts on high priority white pine reproduction stands. First consideration was given to areas needing second working immediately. The remaining camps were placed on first working in young stands. Of the total upland area worked 92 per cent was in pole and reproduction stands. The camps were chiefly confined to the St. Maries, Palouse and Potlatch River drainages. The principal factors taken into consideration to determine the priority of areas were degree of stocking, site, age of stand, amount of infection present, ribes distribution and geographic location. The majority of all areas covered by first and second workings were on comparatively newly disturbed or denuded areas where young white pine had recently become established and represented conditions favorable to the appearance and persistence of ribes. See the accompanying progress map for location of areas worked in 1940.

ORGANIZATION CHART



E.Q.-E.R.A.
Number of Camps - 4
Number of Men - 250

F.-C.C.C.
Number of Camps - 4
Number of Men - 520

F.S.-REG.
Number af Camps - 14
Number of Men - 535

Tatal Number of Men on Blister Rust Work - 1305

1940

METHODS AND EQUIPMENT

The three methods of ribes eradication employed were hand, chemical-spray and decapitation. All employees engaged in the actual application of each method were given intensive training by the supervisory personnel in order to carry on the most efficient ribes eradication job possible. All new ideas, methods and equipment which adapted themselves to more efficient control work were incorporated in the control program.

The newly improved ribes pick continued to be a very desirable and satisfactory tool for the hand eradication crews. So far as was possible each member of all crews was supplied with one of these picks. The axe-type blade is much more desirable than the grub-hoe type blade. Through the use of this tool the efficiency and quality of the work of the hand eradication crews were materially increased.

The practice of laying string lines in advance of the hand eradication crews was continued in all camps. This practice was particularly adaptable to CCC and ERA crews and also proved very satisfactory in regular Forest Service camps on many types of areas.

Close and inspiring supervision is required at all times, and to secure this type of supervision the string lines are laid in advance and each foreman works his crews nearly abreast but in individual crews. In the CCC camps the average was about twenty enrollees to a foreman. In the ERA camps each foreman was assigned about twelve men and these men were in turn made into two- and three-man crews and the crews were worked abreast.

Chemical ribes eradication work was continued in the usual manner. Practically no chemical was required on the second and third working of stream type.

A copy of the control status map for individual camp areas was supplied each camp boss engaged in second working and the control work was carried out according to rework plans indicated thereon. Areas classified as being on maintenance were blocked out from crew work and the acreage was not claimed.

A large scale training program was carried on for all men employed on blister rust control work. Illustrated lectures on blister rust control were given in many of the camps. At the start of the season all supervisory personnel attended a training school of two to three days' duration. In July a one day training school was held for all supervisory personnel. The purpose of this school was to get expressions of new ideas, to incorporate new ideas into the control program, and to discuss present field problems. This school proved very refreshing and helpful.

PREERADICATION

Throughout the field season the permanent personnel continued making field inspections of areas previously worked and areas to be worked in the future. A close watch is maintained on all of the control area with regard to the presence and amount of pine and ribes infection; ribes and pine regeneration and growth; amount and nature of disturbances caused by fire, logging and clearing of lands.

A natural reproduction stocking survey was conducted on 6,400 acres of newly disturbed area. These data were used in blister rust control and silvicultural planning.

CHECKING

The checking organization made very careful inspections of worked areas for the 1940 field season. In addition, inspections were made of a number of areas previously worked.

The checkers throughout the season were given close supervision in order to maintain a high quality of work. Supervision was accomplished by observing the checker along the strip, the rerunning of original check strips and the random inspections of checked areas.

The responsibility of checking current as well as previously worked areas necessitates very careful selection of personnel. Individuals with an outstanding record on eradication for two years or more are considered as best adapted for checker assignments. When such individuals are given the necessary checking training a very high quality of work results. At the beginning of the field season all checkers are required to pull ribes for at least ten days. Such training affords the men an opportunity to develop their "ribes-eye".

A concerted effort was made to confine all checkers to checking activities. However, the services of all men were made available for eradication whenever needed. When no regular check area was available the men were assigned to post check areas.

No deviations were made from standard checking methods except for the recording of bushes under one foot of live stem. Seedlings were recorded as in previous seasons but bushes with less than one foot of live stem that were not considered seedlings were recorded separately and classified as "knots".

In cooperation with eradication two flanking experiments were conducted during the field season. The results for each experiment will be included in a separate report.

Two checker foremen and 15 checkers, directed by a checker supervisor from the Bureau of Entomology and Plant Quarantine, comprised the checking personnel for the operation. (See organization chart for details.)

W 2695, 2693. Typical residual stands following logging of virgin white pine areas. Species composition and density of residual stand will prevent the re-establishment of white pine. Logging disturbance has caused abundant ribes germination. Areas left in this condition will not be sufficiently productive of white pine to justify cost of blister rust control.

W 913, 913-9. Two pictures of the same area showing natural regeneration and growth of western white pine. Snagging has taken place through natural agencies. The upper picture was taken in 1931; the lower in 1940. This area was logged in 1914 or 1915 and was burned about 1917. Area in foreground is grazed annually by sheep.

A total of 38,763 acres was covered by a regular check for $0.16 per acre. 28,973 acres were post checked for $0.06 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
ST. JOE OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 188,360.87
Bureau of Entomology and Plant Quarantine	Regular	9,420.00
	ERA	70,533.39
	Total	79,953.39
Total Expenditures	All Appropriations	$ 268,314.26

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
ST. JOE OPERATION

Item	Forest Service	Bureau of Entomology and Plant Quarantine			Total
	Regular	Regular	ERA	Total	
Salaries, perm. men	$ 3,674.41	$8,475.00	$ 225.00	$ 8,700.00	$ 12,374.41
Salaries, temp. men	21,119.90		9,231.61	9,231.61	30,351.51
Wages, temp. laborers	124,418.50	945.00	41,491.29	42,436.29	166,854.79
Subsistence supplies	25,438.49		14,280.96	14,280.96	39,719.45
Equipment	7,752.22		745.55	745.55	8,497.77
Trucks	564.69				564.69
Travel and transp.	2,797.75		1,788.60	1,788.60	4,586.35
Chemical	384.93				384.93
Twine	1,675.08				1,675.08
Other supplies	534.90		2,770.38	2,770.38	3,305.28
Total	$188,360.87	$9,420.00	$70,533.39	$79,953.39	$268,314.26

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES BY PROGRAMS
ST. JOE OPERATION

Program	Number of Effective Man Days	Expenditures According to Fund		Effective Man Day Cost
EQ-ERA	10,337	EQ-ERA	$ 66,893.39	$7.00
		EQ-Reg.	5,420.00	
		Total	72,313.39	
FS-Reg.	26,145	FS-Reg.	179,386.87	$7.00
		EQ-ERA	540.00	
		EQ-Reg.	3,000.00	
		Total	182,926.87	
CCC	14,036	FS-Reg.	8,642.50	CCC Funds not Included
		EQ-Reg.	1,000.00	
		Total	9,642.50	
Pine Disease Survey		FS-Reg.	331.50	
EQ-ERA Winter Project		EQ-ERA	3,100.00	
Total Cost of 1940 Program			$268,314.26	

	Forest Service	Bureau
Number of meals served	138,294	81,808
Average cost per meal	$0.184	$0.174
Pounds of twine used	8,800	2,369
Pounds of chemical used	4,900	1,600

SUMMARY OF RIBES ERADICATION, 1940
ST. JOE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradicetion Type	Acras First Working	Acras Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribea	Gallons Sprey	Ribes Remeining Par Acra	
								Bushes	Live Stem
Opan Raproduction	1,458	17,727	2,565	21,750	35,060	3,046,696		5	11
Dansa Raproduction		356	35	391	220	5,662		4	3
Open Pola	459	10,741	279	11,479	7,403	473,117		3	8
Dense Pole	138	763		901	199	12,221		1	2
Open Matura	212	2,687	53	2,952	4,397	483,015		9	15
Cutovar		46		46	207	163,335			
Brush		99		99	36	1,822		5	57
All Upland	2,267	32,419	2,932	37,618	47,522	4,185,868		5	10
Stream (Hand)	20	559	566	1,145	2,769	335,601		18	17
Straam (Chamical)		95	46	141	227	12,498	4,166		
All Stream	20	559	566	1,145	2,996	348,099		18	17
All Types	2,287	32,978	3,498	38,763	50,518	4,533,967		5	10

TABLE NO. 3A - FIRST WORKING

Eradication Typa	Acres	Effective Man Days	Total Ribes	Gellons Sprey	Per Acre Besia			Ribes Remaining Per Acre	
					Man Days	Ribes	Gallons Spray	Bushes	Live Stem
Open Reproduction	1,458	3,498	1,042,812		2.40	715		10	22
Open Pole	459	313	46,624		.68	102		5	22
Dense Pole	138	1	64		.01	1		0	0
Opan Mature	212	637	110,545		3.00	521		9	35
All Upland	2,267	4,449	1,200,045		1.96	529		7	22
Straam (Hand)	20	59	18,800		2.95	940			
All Types	2,287	4,508	1,218,845		1.97	533		7	22
TABLE NO. 3B - SECOND WORKING									
Open Reproduction	17,727	28,667	1,887,476		1.62	106		5	11
Dense Reproduction	356	149	4,530		.42	13		4	3
Open Pola	10,741	6,960	422,364		.65	39		3	7
Densa Pola	763	198	12,157		.26	16		2	3
Open Mature	2,687	3,725	369,008		1.39	137		6	12
Cutover	46	207	163,335		4.50	3,551			
Brush	99	36	1,822		.36	18		5	57
All Upland	32,419	39,942	2,860,692		1.23	88		4	9
Stream (Hand)	559	1,781	238,066		3.19	426		18	19
Stream (Chemical)	95	180	8,685	2,895	1.89	91	30		
All Straam	559	1,961	246,751		3.51	441		18	19
All Types	32,978	41,903	3,107,443		1.27	94		5	10
TABLE NO. 3C - THIRD WORKING									
Open Raproduction	2,565	2,895	116,408		1.13	45		6	8
Danse Reproduction	35	71	1,132		2.03	32			
Open Pola	279	130	4,129		.47	15			
Open Mature	53	35	3,462		.66	65		225	
All Uplend	2,932	3,131	125,131		1.07	43		11	8
Stream (Hand)	566	929	78,735		1.64	139		11	3
Stream (Chemicel)	46	47	3,813	1,271	1.02	83	28		
All Stream	566	976	82,548		1.72	146		11	3
All Typea	3,498	4,107	207,679		1.17	59		11	8

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
ST. JOE OPERATION

Working	Class	Acras	Effactiva Man Days	Total Ribes	Gallons Spray	Per Acre Basis			Ribes Remaining Per Acre	
						Man Days	Ribes	Gallons Per Sprayed Area	Bushes	Live Stem
First	EQ-ERA	572	556	140,077		.97	245		1	4
	FS-Reg.	1,210	2,524	846,498		2.09	700		13	26
	F-CCC	505	1,428	232,270		2.83	460		9	32
	Total	2,287	4,508	1,218,845		1.97	533		7	22
Sacond	EQ-ERA	8,612	9,038	1,002,156	900	1.05	116	30	4	10
	FS-Reg.	19,606	20,963	1,500,113	1,995	1.07	77	31	5	9
	F-CCC	4,760	11,902	605,174		2.50	127		5	14
	Totel	32,978	41,903	3,107,443	2,895	1.27	94	30	5	10
Third	EQ-ERA	1,159	743	36,391		.64	31			
	FS-Reg.	1,967	2,658	148,616	1,271	1.35	76	27	6	8
	F-CCC	372	706	22,672		1.90	61		225	
	Total	3,498	4,107	207,679	1,271	1.17	59	28	11	8
All Workings	EQ-ERA	10,343	10,337	1,178,624	900	1.00	114	30	4	9
	FS-Rag.	22,783	26,145	2,495,227	3,266	1.15	110	29	5	9
	F-CCC	5,637	14,036	860,116		2.49	153		7	17
	Total	38,763	50,518	4,533,967	4,166	1.30	117	30	5	10

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
ST. JOE OPERATION

		Number of Acree Worked															
		By Forest Service					By Bureau of Entomology and Plant Quarantine					Total					
		Federal					Federal					Federal					
State	Working	Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Forest Service	Public Domain	Total	State	Private	Total
Idaho	First	985		985	77	653	312	80	392		180	1,297	80	1,377	77	833	2,287
	Second	14,173	360	14,533	2,525	7,308	2,983	123	3,106	1,782	3,724	17,156	483	17,639	4,307	11,032	32,978
	Third	1,731		1,731	41	567	252	46	298		861	1,983	46	2,029	41	1,428	3,498
	Total	16,889	360	17,249	2,643	8,528	3,547	249	3,796	1,782	4,765	20,436	609	21,045	4,425	13,293	38,763

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
ST. JOE OPERATION

	Average Results for All Areas				Area with More Than 25 Feet Live Stem Per Acre		
			Ribes Per Acre			Ribes Per Acre	
Eradication Type	Acres in Checked Area	Acres Checked	Bushes	Live Stem	Acres	Bushes	Live Stem
Open Reproduction	21,750	477	5	11	1,759	18	41
Dense Reproduction	391	16	4	3		0	0
Open Pole	11,479	384	3	8	572	15	56
Dense Pole	901	27	1	2		0	0
Open Mature	2,952	83	9	15	533	12	36
Cutover	46					0	0
Brush	99	4	5	57	42	13	139
All Upland	37,618	991	5	10	2,906	16	45
Stream	1,145	38	18	17		0	0
All Types	38,763	1,029	5	10	2,906	16	45

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
ST. JOE OPERATION

			Ribes by Species					
Working	Eradication Type	Acres	Ribes lacustre	Ribee viscosissimum	Ribee petiolare	Ribee inerme	Ribes irriguum	Total Ribes
Firet	Open Reproduction	1,458	113,535	929,274			3	1,042,812
	Open Pole	459	23,042	23,582				46,624
	Dense Pole	138	1	63				64
	Open Mature	212	72,767	6,735			31,043	110,545
	All Upland	2,267	209,345	959,654			31,046	1,200,045
	Stream	20	17,028	1,772				18,800
	All Typee	2,287	226,373	961,426			31,046	1,218,845
Second	Open Reproduction	17,727	446,952	1,402,777	2,919	34,575	253	1,887,476
	Densa Reproduction	356	3,470	1,060				4,530
	Open Pole	10,741	179,800	233,077	931	8,556		422,364
	Dense Pole	763	8,278	3,879				12,157
	Open Mature	2,687	152,595	198,702	275		17,436	369,008
	Cutover	46	9,620	153,715				163,335
	Brush	99	456	1,366				1,822
	All Upland	32,419	801,171	1,994,576	4,125	43,131	17,689	2,860,692
	Stream	559	202,924	19,514	17,067	7,246		246,751
	All Typee	32,978	1,004,095	2,014,090	21,192	50,377	17,689	3,107,443
Third	Open Reproduction	2,565	88,086	22,362	5,590	370		116,408
	Dense Reproduction	35	662	470				1,132
	Open Pole	279	1,395	2,717	17			4,129
	Open Mature	53	178	3,284				3,462
	All Upland	2,932	90,321	28,833	5,607	370		125,131
	Stream	566	58,654	1,365	11,945	10,584		82,548
	All Typee	3,498	148,975	30,198	17,552	10,954		207,679
All Workings	Open Reproduction	21,750	648,573	2,354,413	8,509	34,945	256	3,046,696
	Dense Reproduction	391	4,132	1,530				5,662
	Open Pole	11,479	204,237	259,376	948	8,556		473,117
	Dense Pole	901	8,279	3,942				12,221
	Open Mature	2,952	225,540	208,721	275		48,479	483,015
	Cutover	46	9,620	153,715				163,335
	Brush	99	456	1,366				1,822
	All Upland	37,618	1,100,837	2,983,063	9,732	43,501	48,735	4,185,868
	Stream	1,145	278,606	22,651	29,012	17,830		348,099
	All Types	38,763	1,379,443	3,005,714	38,744	61,331	48,735	4,533,967

SUMMARY OF RIBES ERADICATION, 1929-1940
ST. JOE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Gallone Spray
Open Reproduction	168,427	56,184	2,979	227,590	297,121	85,640,148	
Denee Reproduction	42,990	3,405	35	46,430	12,651	1,893,986	
Open Pole	63,338	20,778	559	84,675	40,540	7,729,596	
Dense Pole	22,798	2,278		25,076	5,453	984,769	
Open Mature	182,294	9,663	53	192,010	84,568	22,459,361	
Dense Mature	9,745	274		10,019	1,614	267,557	
Cutover	1,009	180		1,189	864	263,717	
Brueh	2,452	431		2,883	1,924	679,187	
Burn	2,224	106		2,330	1,164	806,886	
Subalpine	200			200	416	90,809	
All Upland	495,477	93,299	3,626	592,402	446,315	120,816,016	
Stream (Hand)	34,564	12,149	5,990	52,703	94,236	27,100,137	
Stream (Chemical)	7,384	3,009	493	10,886	26,500	2,362,743	787,581
Stream (Slash)	791	27		818	10,420	409,100	
All Stream	35,355	12,176	5,990	53,521	131,156	29,871,980	
All Types	530,832	105,475	9,616	645,923	577,471	150,687,996	

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallone Spray
Open Reproduction	168,427	223,231	77,544,146		1.33	460	
Dense Reproduction	42,990	11,063	1,744,524		.26	41	
Open Pole	63,338	28,465	6,858,087		.45	108	
Dense Pole	22,798	4,576	915,519		.20	40	
Open Mature	182,294	77,018	21,424,575		.42	118	
Denee Mature	9,745	1,559	255,434		.16	26	
Cutover	1,009	654	100,332		.65	99	
Brueh	2,452	1,881	676,620		.77	276	
Burn	2,224	1,061	795,464		.48	358	
Subalpine	200	416	90,809		2.08	454	
All Upland	495,477	349,924	110,405,510		.71	223	
Stream (Hand)	34,564	63,846	20,803,781		1.85	602	
Stream (Chemical)	7,384	21,605	2,007,093	669,031	2.93	272	91
Stream (Slash)	791	10,101	395,600		12.77	500	
All Stream	35,355	95,552	23,206,474		2.70	656	
All Types	530,832	445,476	133,611,984		.84	252	

TABLE NO. 8B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallone Spray
Open Reproduction	56,184	70,602	7,960,591		1.26	142	
Dense Reproduction	3,405	1,517	148,330		.45	44	
Open Pole	20,778	11,759	857,317		.57	41	
Dense Pole	2,278	877	69,250		.38	30	
Open Mature	9,663	7,515	1,031,324		.78	107	
Dense Mature	274	55	12,123		.20	44	
Cutover	180	210	163,385		1.17	908	
Brush	431	43	2,567		.10	6	
Burn	106	103	11,422		.97	108	
All Upland	93,299	92,681	10,256,309		.99	110	
Stream (Hand)	12,149	21,620	4,791,723		1.78	394	
Stream (Chemical)	3,009	4,495	320,694	106,898	1.49	107	36
Stream (Slash)	27	319	13,500		11.81	500	
All Stream	12,176	26,434	5,125,917		2.17	421	
All Types	105,475	119,115	15,382,226		1.13	146	

TABLE NO. 8C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis Man Days	Per Acre Basis Ribes	Per Acre Basis Gallone Spray
Open Reproduction	2,979	3,288	135,411		1.10	45	
Dense Reproduction	35	71	1,132		2.03	32	
Open Pole	559	316	14,192		.57	25	
Open Mature	53	35	3,462		.66	65	
All Upland	3,626	3,710	154,197		1.02	43	
Stream (Hand)	5,990	8,770	1,504,633		1.46	251	
Stream (Chemical)	493	400	34,956	11,652	.81	71	24
All Stream	5,990	9,170	1,539,589		1.53	257	
All Types	9,616	12,880	1,693,786		1.34	176	

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1929-1940
ST. JOE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Gallons Spray	Per Acre Basis: Man Days	Per Acre Basis: Ribes	Per Acre Basis: Gallons Per Sprayed Area
First	FS-Reg.	81,810	83,069	24,866,105	262,145	1.02	304	95
	EQ-NIRA	42,366	25,571	7,734,978	10,839	.60	183	68
	FS-NIRA	70,714	44,246	14,845,626	101,476	.63	210	129
	EQ-ERA	147,063	92,678	29,461,510	52,667	.63	200	113
	FS-ERA	267	892	487,480		3.34	1,826	
	Cooperative	17,073	13,484	3,864,001	56,611	.79	226	41
	F-CCC	103,184	135,099	40,525,901	162,703	1.31	393	117
	S&P-CCC	68,355	50,437	11,826,383	22,590	.74	173	53
	Total	530,832	445,476	133,611,984	669,031	.84	252	91
Second	FS-Reg.	45,508	49,503	5,673,280	35,426	1.09	125	26
	EQ-NIRA	1,742	1,228	291,131		.70	167	
	EQ-ERA	40,141	35,218	5,630,738	10,557	.88	140	32
	Cooperative	489	291	48,475	2,674	.60	99	11
	F-CCC	15,347	28,518	3,283,003	29,289	1.86	214	55
	S&P-CCC	2,248	4,357	455,599	28,952	1.94	203	54
	Total	105,475	119,115	15,382,226	106,898	1.13	146	36
Third	FS-Reg.	4,262	5,707	668,838	4,130	1.34	157	28
	EQ-ERA	2,993	2,922	455,940	3,025	.98	152	12
	F-CCC	2,292	4,189	566,150	4,497	1.83	247	46
	S&P-CCC	69	62	2,858		.90	41	
	Total	9,616	12,880	1,693,786	11,652	1.34	176	24
All Workings	FS-Reg.	131,580	138,279	31,208,223	301,701	1.05	237	70
	EQ-NIRA	44,108	26,799	8,026,109	10,839	.61	182	68
	FS-NIRA	70,714	44,246	14,845,626	101,476	.63	210	129
	EQ-ERA	190,197	130,818	35,548,188	66,249	.69	187	64
	FS-ERA	267	892	487,480		3.34	1,826	
	Cooperative	17,562	13,775	3,912,476	59,285	.78	223	36
	F-CCC	120,823	167,806	44,375,054	196,489	1.39	367	98
	S&P-CCC	70,672	54,856	12,284,840	51,542	.78	174	53
	Total	645,923	577,471	150,687,996	787,581	.89	233	72

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1929-1940
ST. JOE OPERATION

Working	Number of Acres Worked by Ownership Classes: Federal: Forest Service	Federal: Public Domain	Federal: Total	State-Idaho	Private	Total
First	211,700	12,578	224,278	66,807	239,747	530,832
Second	55,683	4,364	60,047	11,871	33,557	105,475
Third	5,110	130	5,240	765	3,611	9,616
All Workings	272,493	17,072	289,565	79,443	276,915	645,923

TABLE NO. 11

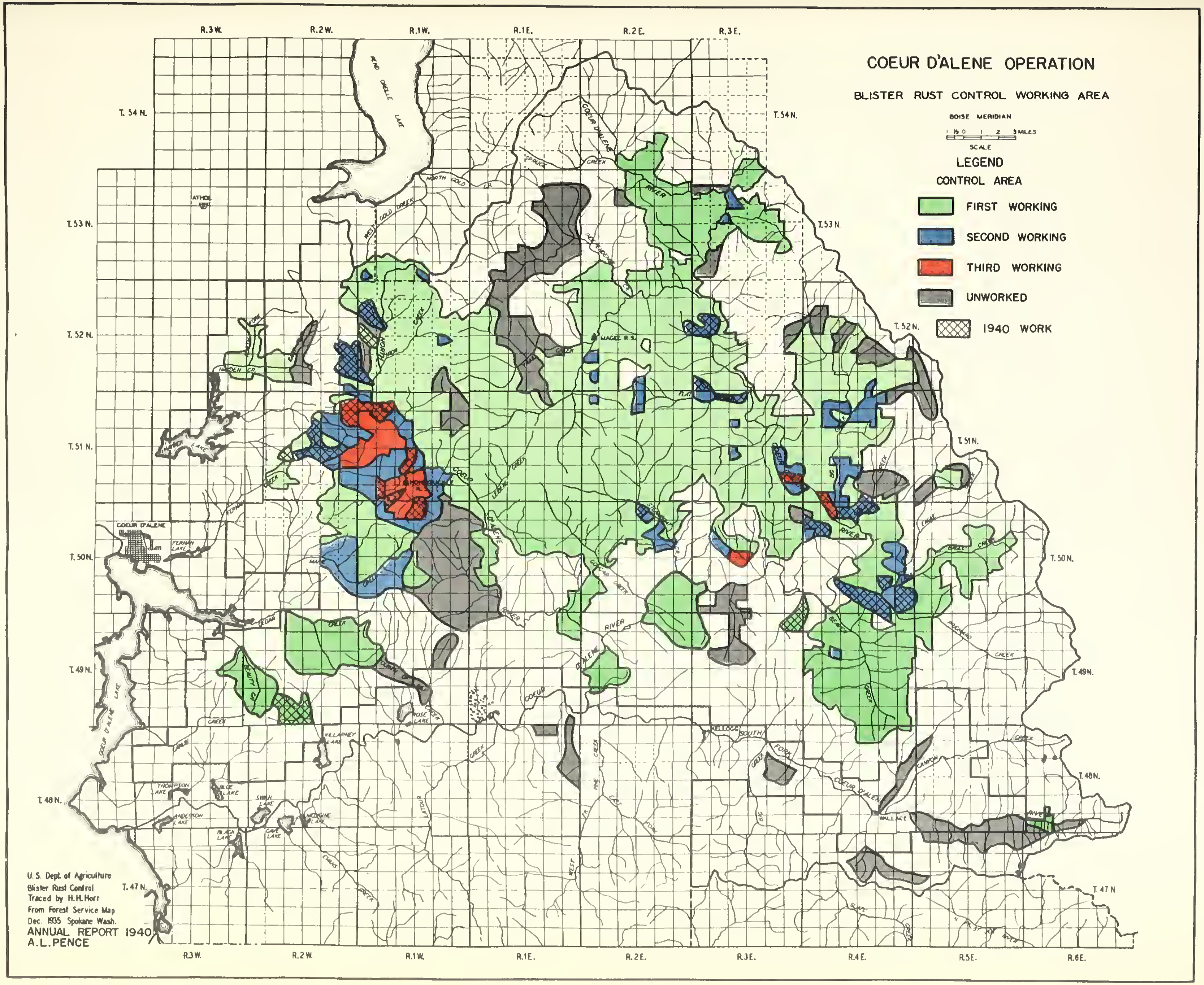
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1929-1940
ST. JOE OPERATION

Ownership	Number of Acres: Worked	Number of Acres: Unworked	Number of Acres: Total	Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
Forest Service	211,700	89,291	300,991	11,089	312,080
Public Domain	12,578	10,847	23,425	1,040	24,465
Subtotal Federal	224,278	100,138	324,416	12,129	336,545
State	66,807	27,248	94,055	20,880	114,935
Private	239,747	136,247	375,994	57,451	433,445
Total	530,832	263,633	794,465	90,460	884,925

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1929-1940
ST. JOE OPERATION

Working	Eradication Type	Acres	Ribes by Species Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	Ribes triste	Total Ribes
First	Open Reproduction	168,427	14,012,736	62,988,415	100,145	304,587	138,263		77,544,146
	Dense Reproduction	42,990	809,862	878,462	13,310	27,287	15,603		1,744,524
	Open Pole	63,338	2,778,102	3,921,862	19,835	61,506	76,782		6,858,087
	Dense Pole	22,798	454,628	457,362	1,335	1,993	201		915,519
	Open Mature	182,294	10,789,815	10,310,260	27,828	42,519	254,153		21,424,575
	Dense Mature	9,745	160,499	94,546	389				255,434
	Cutover	1,009	64,897	30,125	5,269	41			100,332
	Brush	2,452	93,470	579,731	1,987	1,432			676,620
	Burn	2,224	133,557	652,633	8,327	947			795,464
	Subalpine	200	54,975	35,834					90,809
	All Upland	495,477	29,352,541	79,949,230	178,425	440,312	485,002		110,405,510
	Stream	35,355	16,241,403	879,974	3,329,801	2,738,469	16,695	132	23,206,474
	All Types	530,832	45,593,944	80,829,204	3,508,226	3,178,781	501,697	132	133,611,984
Second	Open Reproduction	56,184	2,990,011	4,890,300	31,834	43,569	4,877		7,960,591
	Dense Reproduction	3,405	72,190	76,042		98			148,330
	Open Pole	20,778	407,474	435,411	1,319	13,113			857,317
	Dense Pole	2,278	37,389	31,277	584				69,250
	Open Mature	9,663	450,827	557,289	318	19	22,871		1,031,324
	Dense Mature	274	4,629	7,494					12,123
	Cutover	180	9,650	153,715		20			163,385
	Brush	431	456	2,111					2,567
	Burn	106	5,306	6,116					11,422
	All Upland	93,299	3,977,932	6,159,755	34,055	56,819	27,748		10,256,309
	Stream	12,176	3,007,793	162,265	1,066,114	742,201	6,073	141,471	5,125,917
	All Types	105,475	6,985,725	6,322,020	1,100,169	799,020	33,821	141,471	15,382,226
Third	Open Reproduction	2,979	92,895	36,556	5,590	370			135,411
	Dense Reproduction	35	662	470					1,132
	Open Pole	559	5,695	8,480	17				14,192
	Open Mature	53	178	3,284					3,462
	All Upland	3,626	99,430	48,790	5,607	370			154,197
	Stream	5,990	691,862	22,901	454,498	367,946		2,382	1,539,589
	All Types	9,616	791,292	71,691	460,105	368,316		2,382	1,693,786
All Workings	Open Reproduction	227,590	17,095,642	67,915,271	137,569	348,526	143,140		85,640,148
	Dense Reproduction	46,430	882,714	954,974	13,310	27,385	15,603		1,893,986
	Open Pole	84,675	3,191,271	4,365,753	21,171	74,619	76,782		7,729,596
	Dense Pole	25,076	492,017	488,639	1,919	1,993	201		984,769
	Open Mature	192,010	11,240,820	10,870,833	28,146	42,538	277,024		22,459,361
	Dense Mature	10,019	165,128	102,040	389				267,557
	Cutover	1,189	74,547	183,840	5,269	61			263,717
	Brush	2,883	93,926	581,842	1,987	1,432			679,187
	Burn	2,330	138,863	658,749	8,327	947			806,886
	Subalpine	200	54,975	35,834					90,809
	All Upland	592,402	33,429,903	86,157,775	218,087	497,501	512,750		120,816,016
	Stream	53,521	19,941,058	1,065,140	4,850,413	3,848,616	22,768	143,985	29,871,980
	All Types	645,923	53,370,961	87,222,915	5,068,500	4,346,117	535,518	143,985	150,687,996


COEUR D'ALENE OPERATION
BLISTER RUST CONTROL WORKING AREA
BOISE MERIDIAN
SCALE
3 MILES
LEGEND
CONTROL AREA
FIRST WORKING
SECOND WORKING
THIRD WORKING
UNWORKED
1940 WORK
R.3W.
R.2W.
R.1W.
R.1E.
R.2E.
R.3E.
R.4E.
R.5E.
R.6E.
T.54N.
T.53N.
T.52N.
T.51N.
T.50N.
T.49N.
T.48N.
T.47N.
PEND OREILLE LAKE
COEUR D'ALENE
FERNAN LAKE
ATHOL
WALLACE
KELLOGG
MAGEE R.S.
KILLARNEY LAKE
ROSE LAKE
THOMPSON LAKE
BLUE LAKE
SWAN LAKE
ANDERSON LAKE
BLACK LAKE
CAVE LAKE
MEDICINE LAKE
COEUR D'ALENE LAKE
U.S. Dept. of Agriculture
Blister Rust Control
Traced by H.H.Horr
From Forest Service Map
Dec. 1935 Spokane Wash.
ANNUAL REPORT 1940
A.L.PENCE

RIBES ERADICATION, COEUR D'ALENE OPERATION, 1940

By

Neal D. Nelson, Associate Pathologist, U. S. Forest Service
A. L. Pence, Jr., Assistant Pathologist

INTRODUCTION

The blister rust control program for the Coeur d'Alene Forest was practically the same as in 1939. The three CCC camps assigned to the forest were engaged in ribes eradication from the middle of May to the middle of September. One camp devoted 100 percent of its time to blister rust control. Each of the other two camps had one 25-man crew on other work. Five 30-man camps paid from regular funds and two 60-man ERA camps were assigned to the forest. The average period of employment for the regular camps was three months.

The extremely dry summer made it necessary for all crews to spend considerable time fighting fires. In fact, firefighting consumed 6,579 CCC enrollee man-days. Even though some of the regular camps spent as much as two weeks straight on fires no time was lost to eradication work, as allotted funds were expended before September 15.

LOCATION AND DESCRIPTION OF AREAS

The CCC camps worked in accessible areas. Control work consisted of second and third working of young stands located in Skookum, Deception, Steamboat, Lost, Big, Flat and Brett Creeks. The latter area was planted to white and yellow pine in 1934.

Four of the regular camps were located in the upper portion of the North Fork of the Coeur d'Alene River drainage. The control work consisted mainly of second eradication on areas which have been logged within the last decade. The other regular camp performed first working on Cedar Creek.

One ERA camp performed initial eradication on Fortier Creek, and the other was engaged in second working on Prichard and Eagle Creeks. A third ERA crew, consisting of 40 men, was hauled from Coeur d'Alene for two weeks in June, and performed first and second eradication on stream zone in Hayden Creek.

ORGANIZATION AND ADMINISTRATION

The first camp started work on April 17, and the last camp commenced work on June 6. The first camp was closed on June 30, and the last work was performed on September 27.

The work was organized and administered very much the same as in former years. In order to allow the technical supervisor to operate more effectively, a checking foreman was employed for the first time since 1936. He acted in the capacity of an assistant checking supervisor, as he covered the entire operation.

METHODS AND EQUIPMENT

Eradication methods and equipment as described in the "Ribes Eradication Manual" were employed. The Sheeley ribes hook, described in the 1939 annual report, was used effectively all summer, and it is intended to make more use of this tool.

The procedure outlined in Technical Memorandum No. T-6, designed to reduce eradication costs on cutover areas, was given a practical test on 150 acres of land cutover in 1934. Although detailed records were kept in order to determine the comparative efficiency with ordinary eradication practices, no analysis has yet been made. A complete explanation will be made in a special report.

The possibility of using a one-man eradication crew was tried experimentally. This work shows definite possibilities and will also be explained in a separate report.

The checker-flanker system of ribes eradication was attempted, using a checker and CCC's as flankers. This method was not successful using this type of crew. It is felt that this system will have very limited application on this operation.

CHECKING

Eight checkers and one checker foreman were employed during the past season. Their work consisted largely of regular checking and post checking, with some advance checking being performed.

A total of 15,911 acres of worked area was subjected to a strip check. Approximately 16 per cent of this ground was rechecked once, and two per cent was checked a third time. Heretofore, the per cent of recheck has been much higher. The reduction this year is the result of systematically mopping up areas in advance of the check, which was done on all heavy ribes areas. The following table shows the per acre cost of all regular checking:

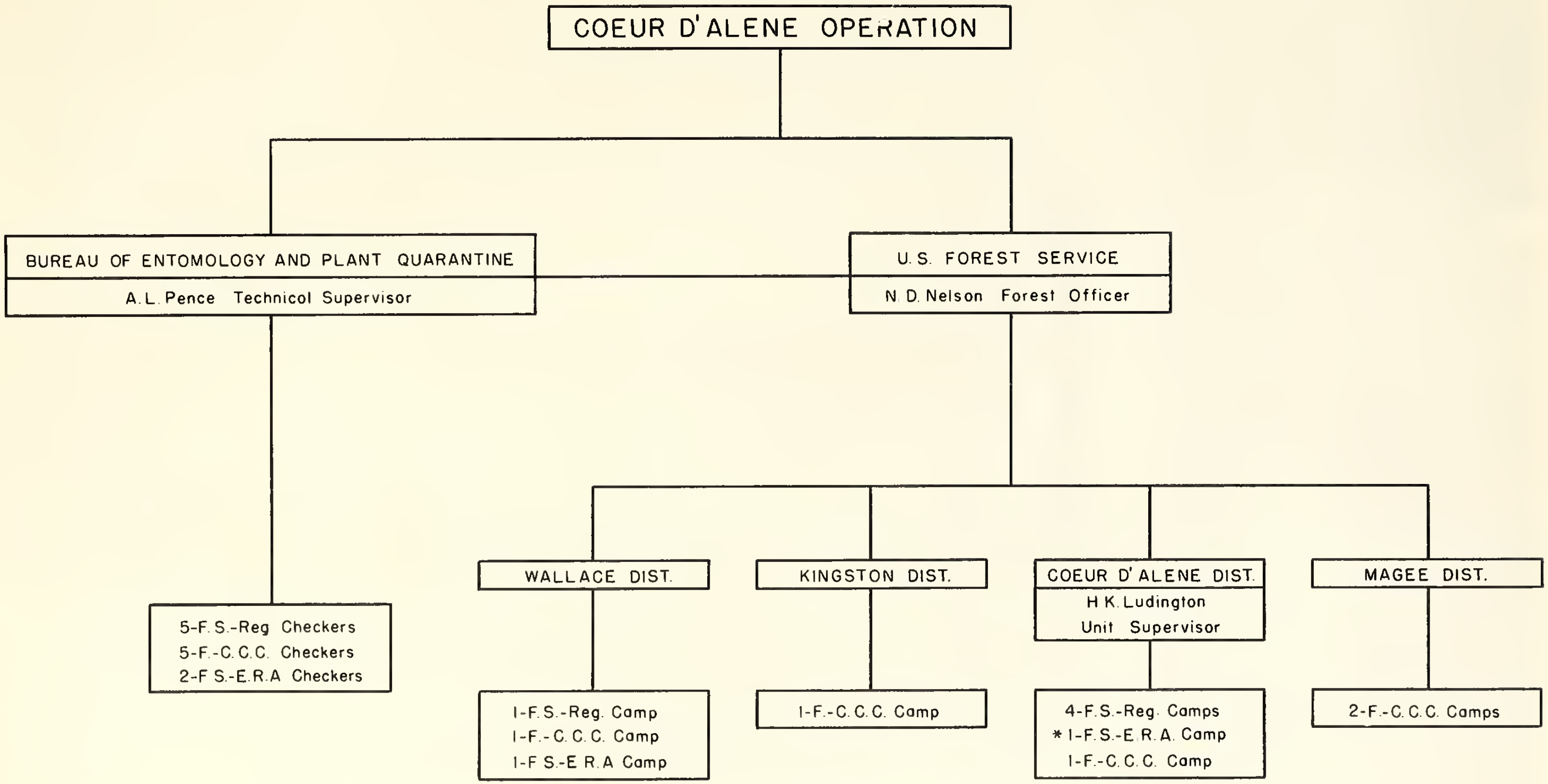
Activity	Cost per Acre
FS-Reg.	$0.172
F-CCC	0.230
FS-ERA	0.089

The average cost of regular checking for the operation was $0.163 per acre, and 6,350 acres were subjected to a post check at a cost of $0.135 per acre.

SURVEYS

A white pine reproduction survey was made to obtain information on cutover and burned areas. During August and the first fifteen days in September one man worked on the survey. A six-man crew was organized at the close of the eradication season composed of camp foremen and checkers who were qualified to perform such work. This crew functioned for one month.

ORGANIZATION CHART



F.S.-E.R.A.
Number of Camps – 2
Number of Men – 120

F.S.-REG.
Number of Camps – 5
Number of Men – 165

F.-C.C.C.
Number of Camps – 5
Number of Men – 315

Total Number of Men on Blister Rust Work – 600

*In Operation from April 20 to June 30

1940

The survey was divided into two distinct steps. A general reconnaissance was first made at which time all areas that could be definitely classed as reproducing satisfactorily, or not reproducing, were mapped. This was followed by an intensive strip survey on all borderline areas. Only those areas which could not be definitely classified by ocular estimate were cruised. In addition to mapping white pine reproduction by degrees of stocking, overwood sample plots were taken, and information recorded on soil, brush and ribes conditions.

There were 7,430 acres covered by extensive survey at a cost of $1,186.79, or an average cost of 16 cents per acre. It is believed that this cost can be materially reduced, by a reduction in the number of overwood sample plots taken, using a smaller crew, and by performing the work during the summer months.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperative agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
COEUR D'ALENE OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 67,950.83
	ERA	36,577.78
	Total	104,528.61
Bureau of Entomology and Plant Quarantine	Regular	2,700.00
	ERA	192.76
	Total	2,892.76
Total Expenditures	All Appropriations	$107,421.37

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
COEUR D'ALENE OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine			Total
	Regular	ERA	Total	Regular	ERA	Total	
Salaries, perm. men	$ 1,994.55		$ 1,994.55	$2,700.00		$2,700.00	$ 4,694.55
Salaries, temp. men	14,637.11	$ 2,097.43	16,734.54				16,734.54
Wages, temp. laborers	37,267.24	26,424.96	63,692.20				63,692.20
Subsistence supplies	9,167.29	6,291.92	15,459.21				15,459.21
Equipment	2,082.56	300.09	2,382.65		$ 3.04	3.04	2,385.69
Travel and transp.	1,176.49	580.17	1,756.66		189.72	189.72	1,946.38
Other supplies	1,625.59	883.21	2,508.80				2,508.80
Total	$67,950.83	$36,577.78	$104,528.61	$2,700.00	$192.76	$2,892.76	$107,421.37

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
COEUR D'ALENE OPERATION

Program	Number of Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
FS-ERA	4,854	FS-ERA	$ 36,577.78	$7.85
		EQ-ERA	192.76	
		FS-Reg.	1,316.66	
		Total	38,087.20	
FS-Reg.	8,803	FS-Reg.	63,961.46	7.42
		EQ-Reg.	1,350.00	
		Total	65,311.46	
F-CCC	4,456	FS-Reg.	1,426.47	CCC Funds Not Included
		EQ-Reg.	1,350.00	
		Total	2,776.47	
Pine Disease Survey		FS-Reg.	59.45	
White Pine Survey		FS-Reg.	1,186.79	
Total Cost of 1940 Program			$107,421.37	

	Forest Service Camps Regular	ERA
Number of meals served	40,630	24,105
Average cost per meal	$0.21	$0.206
Pounds of twine used	2,000	

SUMMARY OF RIBES ERADICATION, 1940
COEUR D'ALENE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	825	4,312	677	5,814	9,790	832,599	3.9	10.2
Dense Reproduction		516	19	535	755	36,310	2.5	6.7
Open Pole	1,412	701	81	2,194	1,857	185,734	3.1	5.4
Dense Pole	272	701	75	1,048	571	93,949	4.7	8.7
Open Mature	203	443	381	1,027	760	52,942	3.4	5.6
Cutover	480	1,380	1,339	3,199	4,980	753,541	8.3	11.4
Brush	136			136	484	67,463	7.6	15.0
Burn		51		51	229	146,911	8.5	6.0
All Upland	3,328	8,104	2,572	14,004	19,426	2,169,449	4.8	9.2
Stream (Hand)	78	849	687	1,614	2,398	287,780	6.1	14.1
Stream (Zone)	90	203		293	302	77,141	6.9	16.9
All Stream	168	1,052	687	1,907	2,700	364,921	6.2	14.6
All Types	3,496	9,156	3,259	15,911	22,126	2,534,370	3.2	10.7

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	825	1,899	381,231	2.30	462	5.9	16.0
Open Pole	1,412	1,240	121,262	.88	86	1.4	4.9
Dense Pole	272	210	26,706	.77	98	1.2	4.5
Open Mature	203	73	8,249	.36	41	1.7	4.2
Cutover	480	933	211,751	1.94	441	9.1	20.2
Brush	136	484	67,463	3.56	496	7.6	15.0
All Upland	3,328	4,839	816,662	1.45	245	3.9	10.3
Stream (Hand)	78	242	50,251	3.10	644	3.4	7.8
Stream (Zone)	90	123	40,256	1.37	447	16.1	30.2
All Stream	168	365	90,507	2.17	539	7.0	14.2
All Types	3,496	5,204	907,169	1.49	259	4.7	11.3

TABLE NO. 3B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes	Bushes	Live Stem
Open Reproduction	4,312	6,823	393,769	1.58	91	3.5	9.2
Dense Reproduction	516	731	35,790	1.42	69	2.5	6.9
Open Pole	701	567	59,488	.81	85	7.0	6.7
Dense Pole	701	338	66,740	.48	95	6.7	11.6
Open Mature	443	422	35,630	.95	80	3.3	5.9
Cutover	1,380	2,388	470,937	1.73	341	9.0	13.0
Burn	51	229	146,911	4.49	2,881	8.5	6.0
All Upland	8,104	11,498	1,209,265	1.42	149	5.0	9.6
Stream (Hand)	849	1,409	182,154	1.66	215	5.5	11.8
Stream (Zone)	203	179	36,885	.88	182	2.2	10.3
All Stream	1,052	1,588	219,039	1.51	208	4.8	11.5
All Types	9,156	13,086	1,428,304	1.43	156	5.0	10.1

TABLE NO. 3C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes	Bushes	Live Stem
Open Reproduction	677	1,068	57,599	1.58	85	3.3	8.5
Dense Reproduction	19	24	520	1.26	27	1.4	1.4
Open Pole	81	50	4,984	.62	62	0	0
Dense Pole	75	23	503	.31	7	.9	.9
Open Mature	381	265	9,063	.70	24	4.8	6.4
Cutover	1,339	1,659	70,853	1.24	53	7.2	5.3
All Upland	2,572	3,089	143,522	1.20	56	5.6	5.9
Stream (Hand)	687	747	55,375	1.09	81	9.9	25.1
All Types	3,259	3,836	198,897	1.18	61	7.1	12.4

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
					Man Days	Ribes	Bushes	Live Stem
First	FS-ERA	1,690	1,624	224,071	.96	133	3.6	7.9
	FS-Reg.	1,691	3,277	672,622	1.94	398	6.2	13.6
	F-CCC	115	303	10,476	2.63	91	5.0	18.4
	Total	3,496	5,204	907,169	1.49	259	4.8	10.7
Second	FS-ERA	2,733	2,980	274,299	1.09	100	2.7	9.5
	FS-Reg.	3,712	5,026	976,945	1.35	263	7.7	12.2
	F-CCC	2,711	5,080	177,060	1.87	65	2.5	5.4
	Total	9,156	13,086	1,428,304	1.43	156	4.9	10.0
Third	FS-ERA	487	250	24,398	.51	50	1.2	4.4
	FS-Reg.	1,142	500	68,920	.44	60	11.5	6.4
	F-CCC	1,630	3,086	105,579	1.89	65	7.3	17.1
	Total	3,259	3,836	198,897	1.18	61	7.1	12.4
All Workings	FS-ERA	4,910	4,854	522,768	.99	106	2.9	8.6
	FS-Reg.	6,545	8,803	1,718,487	1.34	263	7.6	12.1
	F-CCC	4,456	8,469	293,115	1.90	66	4.9	11.3
	Total	15,911	22,126	2,534,370	1.39	159	5.2	10.7

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
COEUR D'ALENE OPERATION

State	Working	Number of Acrea Worked By Forest Service: Forest Service	Private	Total
Idaho	First	3,173	323	3,496
	Second	8,084	1,072	9,156
	Third	2,746	513	3,259
	Total	14,003	1,908	15,911

TAPLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
COEUR D'ALENE OPERATION

Eradication Type	Average Results for All Areas: Acres in Checked Area	Acres Checked	Ribes per Acre: Bushes	Live Stem	Areas with More Than 25 Feet Live Stem per Acre: Acres	Ribes per Acre: Bushes	Live Stem
Open Reproduction	5,814	224	3.9	10.2	792	12.1	36.2
Dense Reproduction	535	22	2.5	6.7	33	12.3	56.2
Open Pole	2,194	79	3.1	5.4			
Dense Pole	1,048	40	4.7	8.7			
Open Meture	1,027	40	3.4	5.6			
Cutover	3,199	125	8.3	11.4	357	26.3	41.5
Brush	136	5	7.6	15.0			
Burn	51	2	8.5	6.0			
All Upland	14,004	537	4.8	9.2	1,182	16.4	38.3
Stream (Hand)	1,614	163	6.1	14.1	94	27.8	148.8
Stream (Zone)	293	36	6.9	16.9	90	16.1	30.2
All Stream	1,907	199	6.2	14.6	184	20.0	69.8
All Types	15,911	736	5.2	10.7	1,366	17.4	47.0

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
COEUR D'ALENE OPERATION

Working	Eradication Type	Acrea	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Total Ribes
First	Open Reproduction	825	204,831	176,400			381,231
	Open Pole	1,412	61,938	59,324			121,262
	Dense Pole	272	20,000	6,706			26,706
	Open Mature	203	4,843	3,406			8,249
	Cutover	480	188,383	23,368			211,751
	Brush	136	8,588	58,875			67,463
	All Upland	3,328	488,583	328,079			816,662
	Stream	168	86,037	4,470			90,507
	All Types	3,496	574,620	332,549			907,169
Second	Open Reproduction	4,312	254,749	133,719	613	4,688	393,769
	Dense Reproduction	516	15,397	20,393			35,790
	Open Pole	701	41,809	17,679			59,488
	Dense Pole	701	46,406	20,334			66,740
	Open Mature	443	23,695	11,935			35,630
	Cutover	1,380	318,997	151,940			470,937
	Burn	51	86,477	60,434			146,911
	All Upland	8,104	787,530	416,434	613	4,688	1,209,265
	Stream	1,052	156,110	1,188	61,741		219,039
	All Types	9,156	943,640	417,622	62,354	4,688	1,428,304
Third	Open Reproduction	677	48,093	8,439	1,067		57,599
	Denae Reproduction	19	520				520
	Open Pole	81	4,984				4,984
	Dense Pole	75	503				503
	Open Mature	381	8,537	526			9,063
	Cutover	1,339	56,690	14,163			70,853
	All Upland	2,572	119,327	23,128	1,067		143,522
	Stream	687	29,518	72	25,785		55,375
	All Types	3,259	148,845	23,200	26,852		198,897
All Workinga	Open Reproduction	5,814	507,673	318,558	1,680	4,688	832,599
	Dense Reproduction	535	15,917	20,393			36,310
	Open Pole	2,194	108,731	77,003			185,734
	Dense Pole	1,048	66,909	27,040			93,949
	Open Mature	1,027	37,075	15,867			52,942
	Cutover	3,199	564,070	189,471			753,541
	Brush	136	8,588	58,875			67,463
	Burn	51	86,477	60,434			146,911
	All Upland	14,004	1,395,440	767,641	1,680	4,688	2,169,449
	Stream	1,907	271,665	5,730	87,526		364,921
	All Types	15,911	1,667,105	773,371	89,206	4,688	2,534,370

SUMMARY OF RIBES ERADICATION, 1927-1940
COEUR D'ALENE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	68,049	10,278	1,619	79,946	139,803	19,374,680
Dense Reproduction	11,832	1,365	19	13,216	12,323	1,206,154
Open Pole	49,527	4,853	658	55,038	31,196	4,544,978
Dense Pole	16,439	929	167	17,535	4,884	696,469
Open Mature	128,834	10,195	1,826	140,855	95,720	15,190,622
Dense Mature	13.023	651		13,674	2,100	261,153
Cutover	11,665	7,032	3,961	22,658	32,626	6,638,273
Brush	10,555	507		11,062	15,717	2,332,028
Burn	5,619	51		5,670	3,738	900,870
Subalpine	485			485	283	76,762
Meadow-Field	157			157		
All Upland	316,185	35,861	8,250	360,296	338,390	51,221,989
Stream (Hand)	13,124	4,250	1,181	18,555	58,795	12,215,888
Stream (Slash)	78	13		91	1,792	68,731
Stream (Machine)	1,045	87		1,132	5,038	566,000
Stream (Zone)	208	2,477		2,685	2,139	227,333
All Stream	14,455	6,827	1,181	22,463	67,764	13,077,952
All Types	330,640	42,688	9,431	382,759	406,154	64,299,941

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
				Man Days	Ribes
Open Reproduction	68,049	117,337	17,699,892	1.72	260
Dense Reproduction	11,832	10,586	1,075,972	.89	91
Open Pole	49,527	27,211	3,900,219	.55	79
Dense Pole	16,439	4,366	617,178	.27	38
Open Mature	128,834	86,481	13,988,483	.67	109
Dense Mature	13,023	1,761	222,188	.14	17
Cutover	11,665	16,011	4,336,397	1.37	372
Brush	10,555	14,983	2,234,161	1.42	212
Burn	5,619	3,509	753,959	.62	134
Subalpine	485	283	76,762	.58	158
Meadow-Field	157				
All Upland	316,185	282,528	44,905,211	.89	142
Stream (Hand)	13,124	48,603	10,931,245	3.70	833
Stream (Slash)	78	1,340	64,934	17.18	832
Stream (Machine)	1,045	4,616	522,500	4.42	500
Stream (Zone)	208	270	55,658	1.30	268
All Stream	14,455	54,829	11,574,337	3.79	801
All Types	330,640	337,357	56,479,548	1.02	171

TABLE NO. 8B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes
Open Reproduction	10,278	19,478	1,489,312	1.90	145
Dense Reproduction	1,365	1,713	129,662	1.25	95
Open Pole	4,853	3,335	537,207	.69	111
Dense Pole	929	424	73,713	.46	79
Open Mature	10,195	8,290	1,092,249	.81	107
Dense Mature	651	339	38,965	.52	60
Cutover	7,032	10,719	1,751,456	1.52	249
Brush	507	734	97,867	1.45	193
Burn	51	229	146,911	4.49	2,881
All Upland	35,861	45,261	5,357,342	1.26	149
Stream (Hand)	4,250	8,823	1,189,300	2.08	280
Stream (Slash)	13	452	3,794	34.77	292
Stream (Machine)	87	422	43,500	4.85	500
Stream (Zone)	2,477	1,869	171,675	.75	69
All Stream	6,827	11,566	1,408,269	1.69	206
All Types	42,688	56,827	6,765,611	1.33	158

TABLE NO. 8C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes
Open Reproduction	1,619	2,988	185,476	1.85	115
Dense Reproduction	19	24	520	1.26	27
Open Pole	658	650	107,552	.99	163
Dense Pole	167	94	5,578	.56	33
Open Mature	1,826	949	109,890	.52	60
Cutover	3,961	5,896	550,420	1.49	139
All Upland	8,250	10,601	959,436	1.28	116
Stream (Hand)	1,181	1,369	95,346	1.16	81
All Types	9,431	11,970	1,054,782	1.27	112

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1927-1940
COEUR D'ALENE OPERATION

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
First	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	FS-Reg.	36,138	36,989	7,343,975	1.02	203
	FS-NIRA	86,083	59,504	13,399,102	.69	156
	EQ-ERA	40,997	35,497	6,584,066	.87	161
	FS-ERA	16,005	19,408	3,063,881	1.21	191
	F-CCC	125,641	177,608	23,242,141	1.41	185
	Total	330,640	337,357	56,479,548	1.02	171
Second	FS-Reg.	15,455	15,447	3,191,362	1.00	206
	FS-NIRA	5,300	2,869	498,629	.54	94
	EQ-ERA	42	44	5,151	1.05	123
	FS-ERA	3,836	4,866	634,163	1.27	165
	F-CCC	18,055	33,601	2,436,306	1.86	135
	Total	42,688	56,827	6,765,611	1.33	158
Third	FS-Reg.	4,863	4,216	615,191	.87	127
	FS-ERA	487	250	24,398	.51	50
	F-CCC	4,081	7,504	415,193	1.84	102
	Total	9,431	11,970	1,054,782	1.27	112
All Workings	EQ-Reg.	25,776	8,351	2,846,383	.32	110
	FS-Reg.	56,456	56,652	11,150,528	1.00	198
	FS-NIRA	91,383	62,373	13,897,731	.68	152
	EQ-ERA	41,039	35,541	6,589,217	.87	161
	FS-ERA	20,328	24,524	3,722,442	1.21	183
	F-CCC	147,777	218,713	26,093,640	1.48	177
	Total	382,759	406,154	64,299,941	1.06	168

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1927-1940
COEUR D'ALENE OPERATION

Working	Number of Acres Worked by Ownership Classes			Total
	Forest Service	State - Idaho	Private	
First	309,979	5,659	15,002	330,640
Second	39,453	530	2,705	42,688
Third	8,406	200	825	9,431
All Workings	357,838	6,389	18,532	382,759

TABLE NO. 11

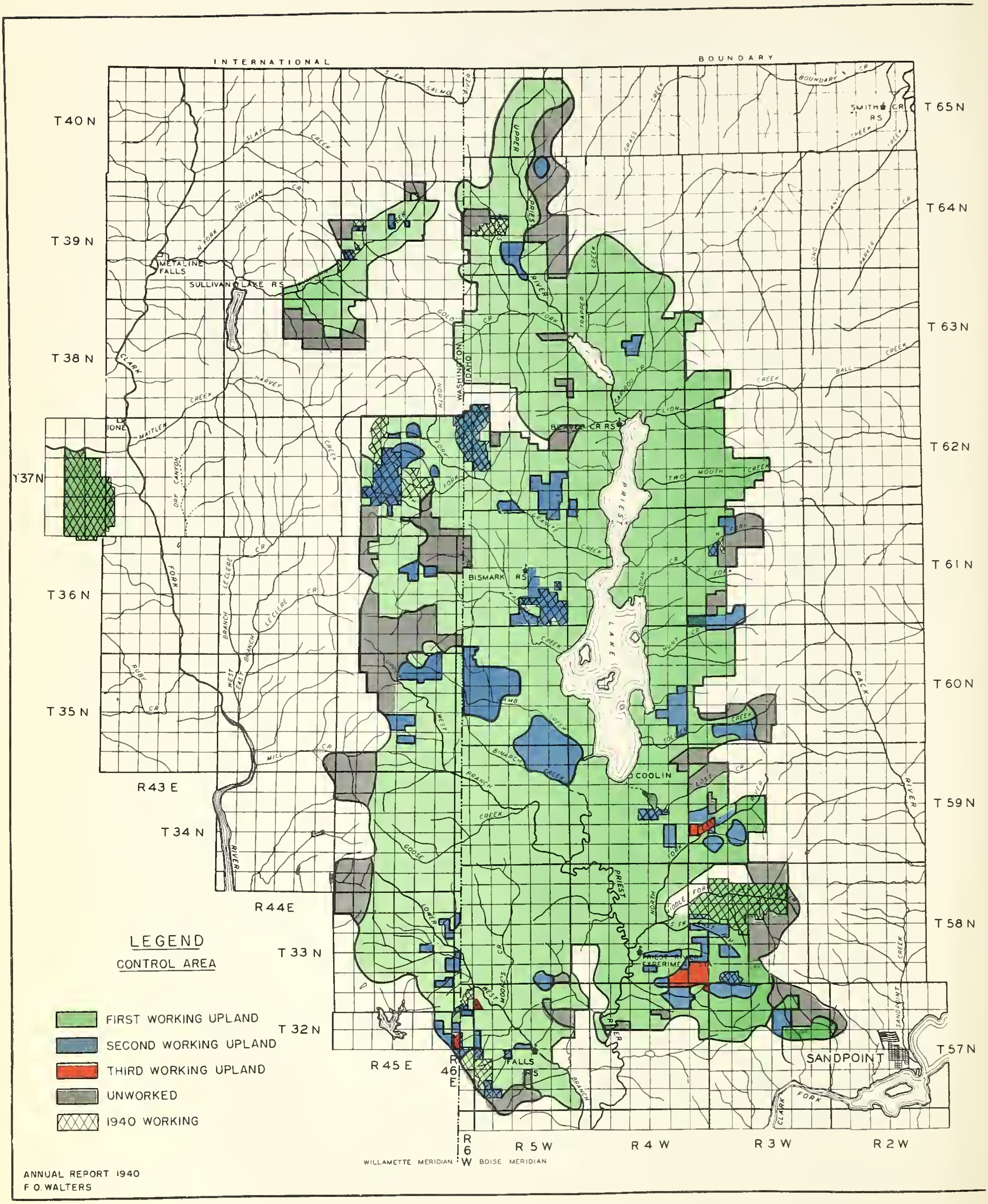
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1927-1940
COEUR D'ALENE OPERATION

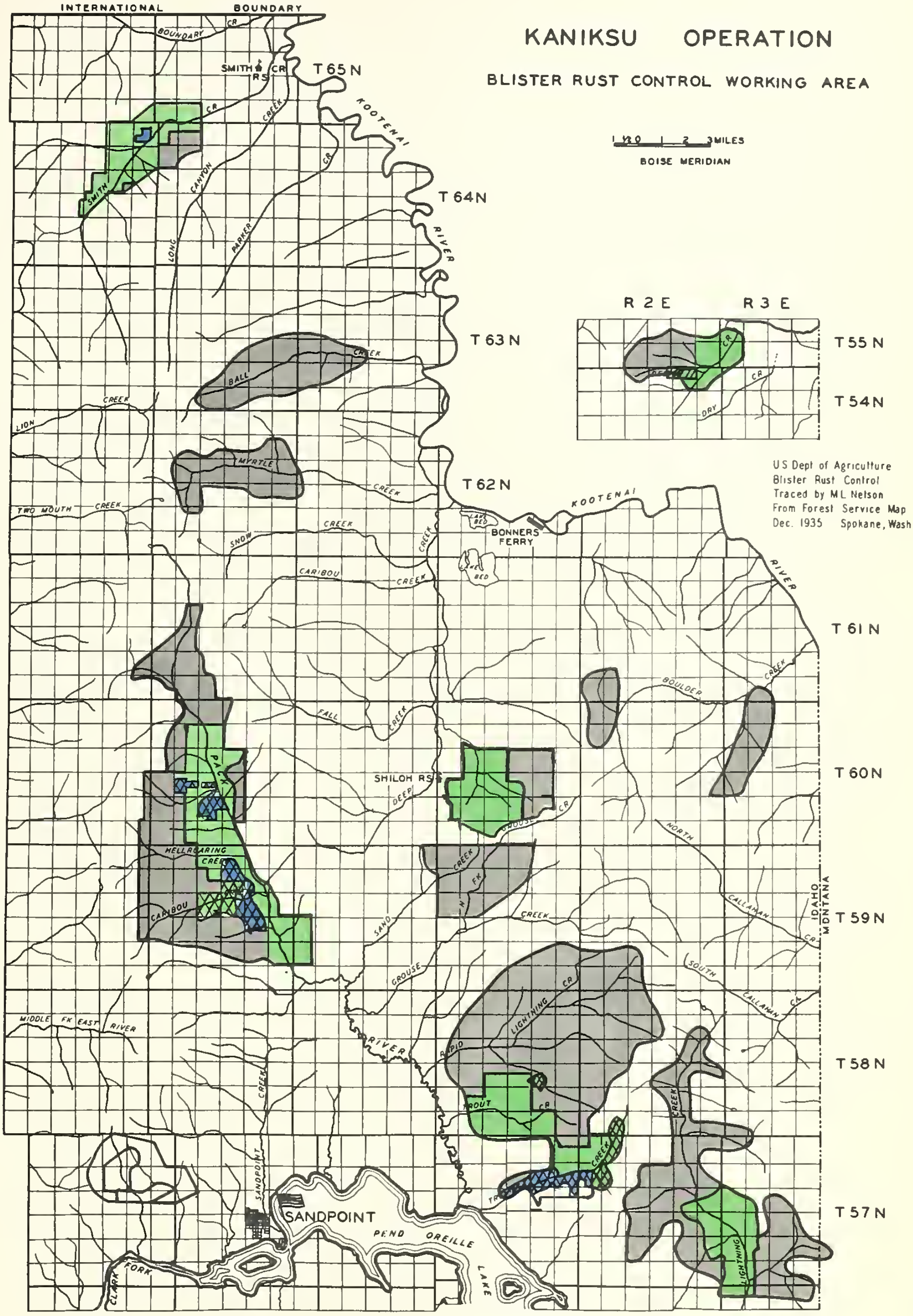
Ownership Class	Number of Acres			Acres Mature Stands on Which Working Is Deferred	Total Acres White Pine
	Worked	Unworked	Total		
Forest Service	309,979	37,723	347,702	10,303	358,005
Public Domain		2,110	2,110		2,110
Subtotal Federal	309,979	39,833	349,812	10,303	360,115
State - Idaho	5,659	1,171	6,830		6,830
Private	15,002	8,497	23,499	5,151	28,650
Total	330,640	49,501	380,141	15,454	395,595

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1927-1940
COEUR D'ALENE OPERATION

Working	Eradication Type	Acres	Ribes by Species					Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes petiolare	Ribes inerme	Ribes irriguum	
First	Open Reproduction	68,049	10,320,289	6,779,650	2,227	498,923	98,803	17,699,892
	Dense Reproduction	11,832	665,227	402,844		5,323	2,578	1,075,972
	Open Pole	49,527	2,194,076	1,642,763	12,246	9,082	42,052	3,900,219
	Dense Pole	16,439	456,946	155,203		3,741	1,288	617,178
	Open Mature	128,834	10,859,965	2,899,230	1	79,624	149,663	13,988,483
	Dense Mature	13,023	193,735	17,816		9,778	859	222,188
	Cutover	11,665	2,940,036	1,351,239	1	17,536	27,585	4,336,397
	Brush	10,555	778,322	1,424,834		25,748	5,257	2,234,161
	Burn	5,619	344,681	390,324		13,530	5,424	753,959
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	316,185	28,808,838	15,085,104	14,475	663,285	333,509	44,905,211
	Stream	14,455	7,095,474	182,129	31,474	4,196,873	68,387	11,574,337
	All Types	330,640	35,904,312	15,267,233	45,949	4,860,158	401,896	56,479,548
Second	Open Reproduction	10,278	753,328	714,425		12,807	8,752	1,489,312
	Dense Reproduction	1,365	102,536	27,032		11	83	129,662
	Open Pole	4,853	424,818	103,206	4,736	3,882	565	537,207
	Dense Pole	929	52,890	20,823				73,713
	Open Mature	10,195	776,536	300,512		11,089	4,112	1,092,249
	Dense Mature	651	37,723	1,017			225	38,965
	Cutover	7,032	1,336,658	398,288		13,430	3,080	1,751,456
	Brush	507	11,517	86,350				97,867
	Burn	51	86,477	60,434				146,911
	All Upland	35,861	3,582,483	1,712,087	4,736	41,219	16,817	5,357,342
	Stream	6,827	966,024	42,668		393,576	6,001	1,408,269
	All Types	42,688	4,548,507	1,754,755	4,736	434,795	22,818	6,765,611
Third	Open Reproduction	1,619	118,827	65,582		1,067		185,476
	Dense Reproduction	19	520					520
	Open Pole	658	96,829	10,723				107,552
	Dense Pole	167	5,578					5,578
	Open Mature	1,826	95,320	14,570				109,890
	Cutover	3,961	471,005	79,415				550,420
	All Upland	8,250	788,079	170,290		1,067		959,436
	Stream	1,181	67,556	113		27,677		95,346
	All Types	9,431	855,635	170,403		28,744		1,054,782
All Workings	Open Reproduction	79,946	11,192,444	7,559,657	2,227	512,797	107,555	19,374,680
	Dense Reproduction	13,216	768,283	429,876		5,334	2,661	1,206,154
	Open Pole	55,038	2,715,723	1,756,692	16,982	12,964	42,617	4,544,978
	Dense Pole	17,535	515,414	176,026		3,741	1,288	696,469
	Open Mature	140,855	11,731,821	3,214,312	1	90,713	153,775	15,190,622
	Dense Mature	13,674	231,458	18,833		9,778	1,084	261,153
	Cutover	22,658	4,747,699	1,828,942	1	30,966	30,665	6,638,273
	Brush	11,062	789,839	1,511,184		25,748	5,257	2,332,028
	Burn	5,670	431,158	450,758		13,530	5,424	900,870
	Subalpine	485	55,561	21,201				76,762
	Meadow-Field	157						
	All Upland	360,296	33,179,400	16,967,481	19,211	705,571	350,326	51,221,989
	Stream	22,463	8,129,054	224,910	31,474	4,618,126	74,388	13,077,952
	All Types	382,759	41,308,454	17,192,391	50,685	5,323,697	424,714	64,299,941


INTERNATIONAL BOUNDARY
T 40 N
T 39 N
T 38 N
T 37 N
T 36 N
T 35 N
T 34 N
T 33 N
T 32 N
T 65 N
T 64 N
T 63 N
T 62 N
T 61 N
T 60 N
T 59 N
T 58 N
T 57 N
R 43 E
R 44 E
R 45 E
R 46 E
R 6 W
R 5 W
R 4 W
R 3 W
R 2 W
WASHINGTON
IDAHO
METALINE FALLS
SULLIVAN LAKE R.S.
IONE
SMITH CR R.S.
BEAVER CR R.S.
BISMARK R.S.
COOLIN
PRIEST LAKE
SANDPOINT
WILLAMETTE MERIDIAN
BOISE MERIDIAN
LEGEND
CONTROL AREA
FIRST WORKING UPLAND
SECOND WORKING UPLAND
THIRD WORKING UPLAND
UNWORKED
1940 WORKING
ANNUAL REPORT 1940
F. O. WALTERS



KANIKSU OPERATION
BLISTER RUST CONTROL WORKING AREA
BOISE MERIDIAN
MILES
INTERNATIONAL BOUNDARY
US Dept of Agriculture
Blister Rust Control
Traced by M.L. Nelson
From Forest Service Map
Dec. 1935 Spokane, Wash
T 65 N
T 64 N
T 63 N
T 62 N
T 61 N
T 60 N
T 59 N
T 58 N
T 57 N
T 55 N
T 54 N
R 3 W
R 2 W
R 1 W
R 1 E
R 2 E
R 3 E
KOOTENAI RIVER
BONNERS FERRY
SANDPOINT
PEND OREILLE LAKE
SHILOH R.S.
SMITH CR R.S.
IDAHO
MONTANA
CLARK FORK

RIBES ERADICATION, KANIKSU OPERATION, 1940

by
Frank O. Walters, Associate Pathologist
Kermit Miller, Assistant Pathologist, U. S. Forest Service
Harold A. Brischle, Assistant Pathologist

INTRODUCTION

The Kaniksu operation includes the lands of the Kaniksu National Forest and the Priest Lake Timber Protective Association.

The Forest Service program consisted of five camps of 33 men each, financed by regular appropriations; two CCC camps, which used an average of 50 men each on eradication work; and from ERA allotments 75 men were carried on eradication work until July 1, when the number was reduced to 50.

The Bureau of Entomology and Plant Quarantine hauled daily 150 men from Sandpoint and 50 men from Priest River. One 40-man camp and one 20-man camp were financed on a cooperative basis between the Bureau and the State of Idaho. In these camps the State paid all wages and the Bureau furnished equipment, supplies, and transportation. Technical supervision was provided for 75 men on eradication work in one State CCC camp.

ORGANIZATION AND ADMINISTRATION

Administrative headquarters were located at Kalispell Bay. Subsistence supplies and equipment for the individual camps were dispatched from headquarters with trucks, boat and pack stock being used to make deliveries. The accompanying organization chart shows the division of responsibility on the operation.

The first camp opened May 3, the last one, June 20. The first camp closed August 26, and the last one, October 20.

LOCATION AND DESCRIPTION OF AREAS

The regular Forest Service camps were located in the South Fork of Granite Creek, Tillicum Creek, Hughes Meadow, and the Tiger Hill area. The Forest Service ERA camps performed work in Twin Creek and Lakeview Mountain areas. The Bureau camps operated in Pack River, Trestle Creek, and the area west of Olson's mill. The State camps were assigned to the Middle Fork of East River and the North Fork of Indian Creek. One Forest Service CCC camp worked on Lakeview Mountain, and the other in Pass Creek and Gypsy Creek in the Sullivan Lake area. The State CCC camp had crews in Big Creek and in the vicinity of Chase Lake.

The areas ranged from very heavy to light as regards working conditions.

METHODS AND EQUIPMENT

In general, standard methods and equipment were used. Two-man crews were used to some extent but not sufficient data were secured to establish definitely the efficiency of this method of work. Under the guidance of the checking organization the use of the flanking method was extended and a considerable acreage was covered in this way.

Great care was exercised in the selection of the personnel for the Forest Service regular camps and consequently a higher type of laborer was secured, which in turn resulted in an increase in efficiency and output of work.

There was considerable interruption of the work due to fire but in all cases the men were released from the fires as soon as possible. Fire suppression training was given to all the forestry students as well as to other outstanding men. These men were of great aid during the past critical fire season in the detection and suppression of numerous fires.

One principle that was put into practice in the regular camps was that the crews could move along at a more rapid rate of speed than in the past and leave the careful job of minute search to the more highly skilled and faster mop-up men. It is felt that this practice, properly organized, is one means of speeding up the work. Only occasionally can this method be successfully used with WPA labor.

CHECKING

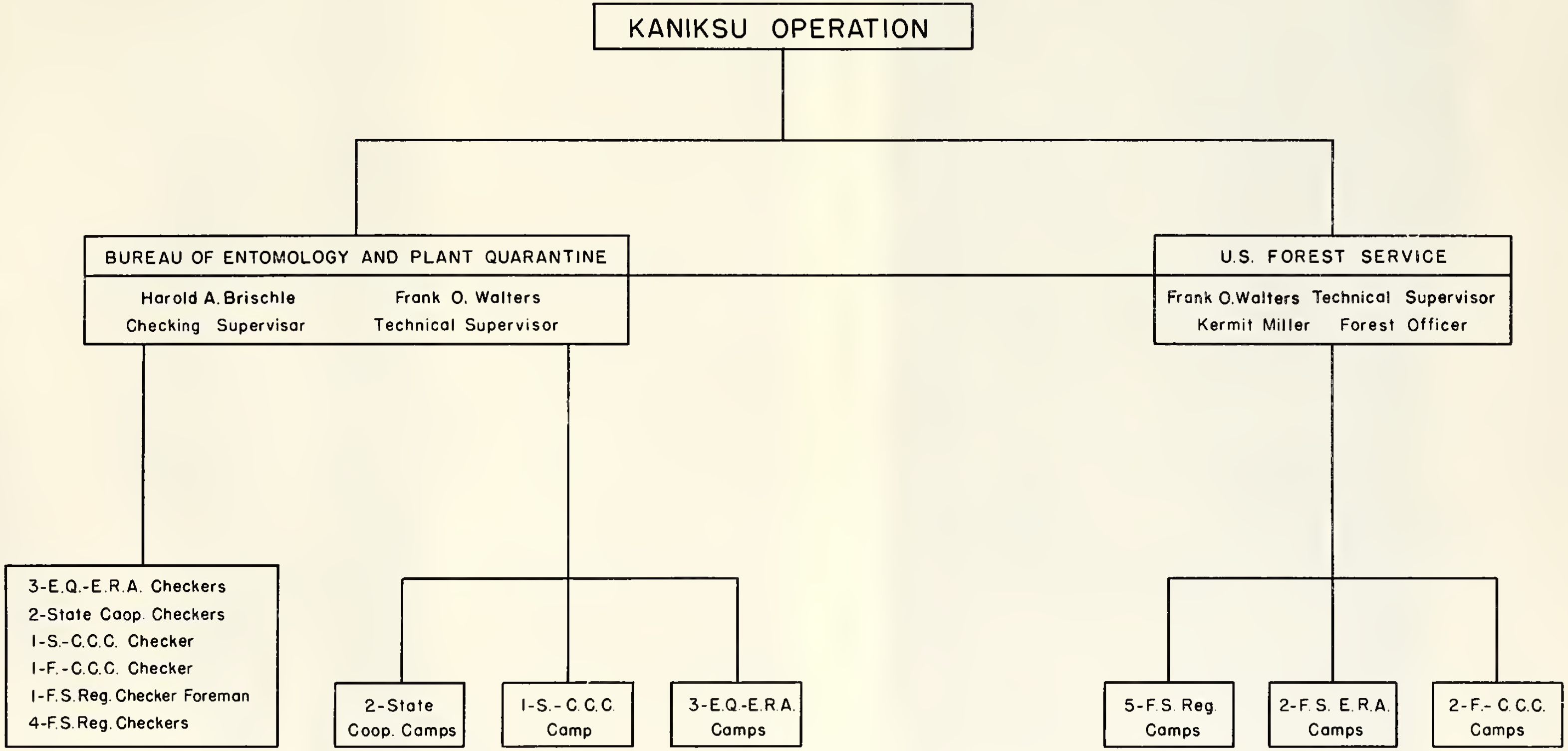
In order to determine the distribution and number of ribes on an area and plan an effective blister rust control program, a system of sampling called checking is employed. Field data obtained by this method play an important part at three stages in the control program.

First, it is employed to determine the ribes conditions on an area prior to eradication, in order to dispatch the proper number of crewmen for efficient work and to eliminate from crew work those areas having no ribes. Secondly, a check is made after eradication crews have covered an area to show whether or not the work conforms to set standards. Thirdly, on sites favorable to ribes germination additional eradication work may be necessary in the future; so a post check is made several years after the first eradication to show the extent to which ribes are regenerating and the urgency of additional control work.

It is essential that men doing checking work be thoroughly reliable and conscientious. Therefore, only men having had at least one year or more of eradication experience are used. These men are carefully trained and are under the constant supervision of the checking supervisor, who inspects their work and data regularly to insure and maintain high caliber performance.

Frequently the checkers encounter areas on which ribes are few and occurring in rather well defined patches. It has been recognized that on

ORGANIZATION CHART



STATE COOP.
Number of Camps - 2
Number of Men - 66

E.Q.-E.R.A.
Number of Camps - 4
Number of Men - 210

F.S.-REG.
Number af Camps - 5
Number of Men - 176

S.-C.C.C.
Number of Camps - 1
Number of Men - 79

F.-C.C.C.
Number of Camps - 5
Number af Men - 107

F.S.-E.R.A.
Number af Camps - 2
Number of Men - 66

Total Number of Men on Blister Rust Work - 704

1940

W 2452. The extensive stands of white pine around beautiful Priest Lake have important esthetic values as well as commercial values.

W 2461. Modes of transportation on the Kaniksu operation are varied. Here may be seen pack stock, transported by boat and barge, loaded with supplies for a remote camp.

areas such as this a checker accompanied by several specially trained fast men could do an effective job of eradication faster than a regular eradication crew. Accordingly, this method was used effectively on several areas during the past season and has been referred to as the "checker flanker method". The use of this method is limited to areas on which ribes are fairly large and not obscured by brush or vegetation.

During the field season, the checking organization inspected 30,174 acres of current season work. Most of these areas were given a four per cent check in upland types and eight per cent, or more, in stream type. For all classes of camps, the check showed four ribes with 11 feet of live stem remaining on upland areas and six ribes with 11 feet of live stem in stream type. The cost of conducting this check was $0.112 per acre for all classes of camps.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables by the cooperating agency and the type of appropriation:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
KANIKSU OPERATION

Cooperating Agency	Appropriation	Amount
Forest Service	Regular	$ 66,637.49
	ERA	11,643.61
	Total	78,281.10
Bureau of Entomology and Plant Quarantine	Regular	4,900.00
	ERA	62,640.05
	Total	67,540.05
State of Idaho	State of Idaho	10,034.48
Total Expenditures	All Appropriations	$155,855.63

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
KANIKSU OPERATION

Item	Forest Service			Bureau of Entomology and Plant Quarantine			State of Idaho	Total
	Regular	ERA	Total	Regular	ERA	Total		
Salaries, perm. men	$ 2,199.92		$ 2,199.92	$4,900.00		$ 4,900.00		$ 7,099.92
Salaries, temp. men	8,226.37	$ 237.60	8,463.97		$ 5,186.00	5,186.00		13,649.97
Wages, temp. laborers	46,832.01	9,666.10	56,498.11		49,767.12	49,767.12	$10,034.48	116,299.71
Subsistence supplies	7,537.11	1,002.27	8,539.38		2,757.24	2,757.24		11,296.62
Equipment	26.48	28.12	54.60		860.68	860.68		915.28
Trucks and bulldozer	482.96	459.03	941.99					941.99
Travel and transp.	949.84	18.79	968.63		1,771.20	1,771.20		2,739.83
Other supplies	382.80	231.70	614.50		2,297.81	2,297.81		2,912.31
Total	$66,637.49	$11,643.61	$78,281.10	$4,900.00	$62,640.05	$67,540.05	$10,034.48	$155,855.63

TABLE NO. 2A

DISTRIBUTION OF BLISTER RUST CONTROL EXPENDITURES
BY PROGRAMS
KANIKSU OPERATION

Program	Number of Effective Man-Days	Expenditures According to Fund		Effective Man-Day Cost
EQ-ERA	11,851	EQ-ERA	$ 60,882.81	$5.42
		EQ-Reg.	3,400.00	
		Total	64,282.81	
FS-Regular	8,782	FS-Reg.	65,236.94	7.46
		EQ-Reg.	300.00	
		Total	65,536.94	
FS-ERA	2,222	FS-ERA	11,643.61	5.24
State-Coop.	2,111	State	10,034.48	6.01
		EQ-Reg.	900.00	
		EQ-ERA	1,757.24	
		Total	12,691.72	
CCC	4,358	FS-Reg.	800.00	CCC Funds Not Included
		EQ-Reg.	300.00	
		Total	1,100.00	
Pine Disease Survey		FS-Reg.	600.55	
Total Cost of 1940 Program			$155,855.63	

	Forest Service	Bureau
Number of meals served	54,526	14,385
Average cost per meal	$.1849	$.171
Pounds of twine used	3,490	2,308

SUMMARY OF RIBES ERADICATION, 1940
KANIKSU OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	7,889	9,743	256	17,888	18,732	4,413,538	3	9
Dense Reproduction		9		9	24	35	0	0
Open Pole	5,035	1,199		6,234	4,524	624,953	4	15
Dense Pole	1,478	364		1,842	878	50,117	2	11
Open Mature	711	243		954	524	120,192	5	14
Dense Mature	792			792				
Cutover	329	489		818	1,543	188,763	10	22
All Upland	16,234	12,047	256	28,537	26,225	5,397,598	4	11
Stream (Hand)	660	918	59	1,637	3,099	559,086	6	11
All Types	16,894	12,965	315	30,174	29,324	5,956,684	4	11

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	7,889	9,688	3,080,729	1.23	391	3	11
Open Pole	5,035	3,367	501,298	.67	100	4	16
Dense Pole	1,478	546	33,644	.37	23	2	12
Open Mature	711	337	114,424	.47	161	6	18
Dense Mature	792						
Cutover	329	374	44,856	1.14	136	4	8
All Upland	16,234	14,312	3,774,951	.88	233	3	13
Stream (Hand)	660	1,918	420,193	.29	637	5	15
All Types	16,894	16,230	4,195,144	.96	248	4	13

TABLE NO. 3B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes	Bushes	Live Stem
Open Reproduction	9,743	8,628	1,320,827	.89	136	4	8
Dense Reproduction	9	24	35	2.67	4		
Open Pole	1,199	1,157	123,655	.96	103	4	11
Dense Pole	364	332	16,473	.91	45	1	4
Open Mature	243	187	5,768	.77	24	2	4
Cutover	489	1,169	143,907	2.39	294	15	32
All Upland	12,047	11,497	1,610,665	95	134	4	9
Stream (Hand)	918	1,145	134,419	1.25	146	6	7
All Types	12,965	12,642	1,745,084	.98	135	4	8

TABLE NO. 3C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Man Days	Ribes	Bushes	Live Stem
Open Reproduction	256	416	11,982	1.63	47	2	3
All Upland	256	416	11,982	1.63	47	2	3
Stream (Hand)	59	36	4,474	.61	76	3	7
All Types	315	452	16,456	1.43	52	2	4

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes	Ribes Remaining Per Acre Bushes	Ribes Remaining Per Acre Live Stem
Idaho	First	EQ-ERA	4,456	7,433	750,209	1.67	168		
		FS-ERA	332	217	29,439	.65	89		
		FS-Reg.	796	1,003	348,162	1.26	437		
		State Coop.	4,842	1,874	474,073	.39	98		
		Total	10,426	10,527	1,601,883	1.01	154		
	Second	EQ-ERA	3,485	3,743	232,133	1.07	67		
		FS-ERA	1,556	2,005	106,565	1.29	68		
		FS-Reg.	2,530	869	334,241	.34	132		
		State Coop.	373	237	35,482	.64	95		
		F-CCC	729	1,788	134,411	2.45	184		
		S-CCC	671	1,294	127,057	1.93	189		
		Total	9,344	9,936	969,889	1.06	104		
	Third	EQ-ERA	123	100	5,943	.81	48		
	All Workings	EQ-ERA	8,064	11,276	988,285	1.40	123		
		FS-ERA	1,888	2,222	136,004	1.18	72		
		FS-Reg.	3,326	1,872	682,403	.56	205		
		State Coop.	5,215	2,111	509,555	.40	98		
		F-CCC	729	1,788	134,411	2.45	184		
		S-CCC	671	1,294	127,057	1.93	189		
		Total	19,893	20,563	2,577,715	1.03	130		
Washington	First	FS-Reg.	6,359	5,357	2,555,239	.84	402		
		F-CCC	109	346	38,022	3.17	349		
		Total	6,468	5,703	2,593,261	.88	401		
	Second	EQ-ERA	120	223	61,580	1.86	513		
		FS-Reg.	2,811	1,553	638,172	.55	227		
		F-CCC	690	930	75,443	1.35	109		
		Total	3,621	2,706	775,195	.75	214		
	Third	EQ-ERA	192	352	10,513	1.83	55		
	All Workings	EQ-ERA	312	575	72,093	1.84	231		
		FS-Reg.	9,170	6,910	3,193,411	.75	348		
		F-CCC	799	1,276	113,465	1.60	142		
		Total	10,281	8,761	3,378,969	.85	329		
Idaho and Washington	First	EQ-ERA	4,456	7,433	750,209	1.67	168	4	11
		FS-ERA	332	217	29,439	.65	89	7	47
		FS-Reg.	7,155	6,360	2,903,401	.89	406	3	10
		State Coop	4,842	1,874	474,073	.39	98	5	18
		F-CCC	109	346	38,022	3.17	349	14	50
		Total	16,894	16,230	4,195,144	.96	248	4	13
	Second	EQ-ERA	3,605	3,966	293,713	1.10	81	4	9
		FS-ERA	1,556	2,005	106,565	1.29	68	3	8
		FS-Reg.	5,341	2,422	972,413	.45	182	3	5
		State Coop.	373	237	35,482	.64	95	5	11
		F-CCC	1,419	2,718	209,854	1.92	148	10	13
		S-CCC	671	1,294	127,057	1.93	189	9	22
		Total	12,965	12,642	1,745,084	.98	135	4	8
	Third	EQ-ERA	315	452	16,456	1.43	52	2	4
	All Workings	EQ-ERA	8,376	11,851	1,060,378	1.41	127	4	10
		FS-ERA	1,888	2,222	136,004	1.18	72	3	15
		FS-Reg.	12,496	8,782	3,875,814	.70	310	3	8
		State Coop.	5,215	2,111	509,555	.40	98	5	18
		F-CCC	1,528	3,064	247,876	2.01	162	11	16
		S-CCC	671	1,294	127,057	1.93	189	9	22
		Total	30,174	29,324	5,956,684	.97	197	4	11

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
KANIKSU OPERATION

Stete	Working	Number of Acres Worked									Total
		By Forest Service			By Bureau of Entomology and Plant Querantine			Total			
		Forest Service	Stete	Private	Forest Service	State	Private	Forest Service	State	Private	
Idaho	First	1,048		80	2,511	5,392	1,395	3,559	5,392	1,475	10,426
	Second	4,395		420	1,903	695	1,931	6,298	695	2,351	9,344
	Third				84		39	84		39	123
	Total	5,443		500	4,498	6,087	3,365	9,941	6,087	3,865	19,893
Weshington	First	4,738	50	1,680				4,738	50	1,680	6,468
	Second	2,036		1,465	90		30	2,126		1,495	3,621
	Third						192			192	192
	Total	6,774	50	3,145	90		222	6,864	50	3,367	10,281
Totel	First	5,786	50	1,760	2,511	5,392	1,395	8,297	5,442	3,155	16,894
	Second	6,431		1,885	1,993	695	1,961	8,424	695	3,846	12,965
	Third				84		231	84		231	315
	Total	12,217	50	3,645	4,588	6,087	3,587	16,805	6,137	7,232	30,174

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
KANIKSU OPERATION

Eradication Type	Average Results for All Areee			
	Acres in Checked Area	Acres Checked	Ribes Per Acre	
			Bushes	Live Stem
Open Reproduction	17,888	671.3	3	9
Dense Reproduction	9	.4	0	0
Open Pole	6,234	180.6	4	15
Dense Pole	1,842	66.9	2	11
Open Mature	954	32.3	5	14
Dense Maturc	792			
Cutover	818	29.7	10	22
All Uplend	28,537	981.2	4	11
Stream	1,637	205.7	6	11
All Types	30,174	1,186.9	4	11

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
KANIKSU OPERATION

Working	Eradication Type	Acree	Ribes by Species			Total Ribes
			Ribes lecustre	Ribes viscosissimum	Ribes inerme	
First	Open Reproduction	7,889	866,914	2,213,815		3,080,729
	Open Pole	5,035	236,882	264,416		501,298
	Dense Pole	1,478	32,291	1,353		33,644
	Open Mature	711	99,682	14,742		114,424
	Dense Meture	792				
	Cutover	329	16,742	26,330	1,784	44,856
	All Upland	16,234	1,252,511	2,520,656	1,784	3,774,951
	Stream	660	392,493	26,579	1,121	420,193
	All Typee	16,894	1,645,004	2,547,235	2,905	4,195,144
Second	Open Reproduction	9,743	351,737	969,090		1,320,827
	Dense Reproduction	9	35			35
	Open Pole	1,199	61,633	62,022		123,655
	Dense Pole	364	11,666	4,807		16,473
	Open Mature	243	2,478	3,290		5,768
	Cutover	489	32,685	111,080	142	143,907
	All Upland	12,047	460,234	1,150,289	142	1,610,665
	Stream	918	124,037	8,014	2,368	134,419
	All Typee	12,965	584,271	1,158,303	2,510	1,745,084
Third	Open Reproduction	256	4,428	7,185	369	11,982
	Stream	59	4,271	203		4,474
	All Types	315	8,699	7,388	369	16,456
All Workings	Open Reproduction	17,888	1,223,079	3,190,090	369	4,413,538
	Denee Reproduction	9	35			35
	Open Pole	6,234	298,515	326,438		624,953
	Dense Pole	1,842	43,957	6,160		50,117
	Open Meture	954	102,160	18,032		120,192
	Dense Mature	792				
	Cutover	818	49,427	137,410	1,926	188,763
	All Upland	28,537	1,717,173	3,678,130	2,295	5,397,598
	Stream	1,637	520,801	34,796	3,489	559,086
	All Types	30,174	2,237,974	3,712,926	5,784	5,956,684

SUMMARY OF RIBES ERADICATION, 1923-1940
KANIKSU OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	134,361	23,359	1,984	159,704	121,250	32,331,551
Dense Reproduction	22,524	2,327		24,851	13,830	1,888,894
Open Pole	98,102	10,706		108,808	40,640	5,659,057
Dense Pole	21,327	2,174	11	23,512	4,704	451,084
Open Mature	109,927	4,147	29	114,103	28,804	5,605,574
Dense Mature	31,047	601		31,648	3,782	433,532
Cutover	7,587	2,052		9,639	8,451	2,463,400
Brush	3,599	596	32	4,227	1,486	364,707
Burn	1,132			1,132	1,354	947,874
Subalpine	1,933	50		1,983	1,032	157,110
Meadow-Field	71	10		81	1	72
All Upland	431,610	46,022	2,056	479,688	225,334	50,302,855
Stream (Hand)	20,494	4,810	274	25,578	44,885	9,149,677
Stream (Slash)	576			576	4,994	288,000
Stream (Machine)	1,030			1,030	7,081	614,076
All Stream	22,100	4,810	274	27,184	56,960	10,051,753
All Types	453,710	50,832	2,330	506,872	282,294	60,354,608

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Open Reproduction	134,361	96,362	28,417,687	.72	212
Dense Reproduction	22,524	11,655	1,700,022	.52	75
Open Pole	98,102	35,353	5,231,035	.36	53
Dense Pole	21,327	3,924	402,183	.18	19
Open Mature	109,927	26,430	5,339,049	.24	49
Dense Mature	31,047	3,584	415,459	.12	13
Cutover	7,587	3,779	1,071,116	.50	141
Brush	3,599	1,104	336,107	.31	93
Burn	1,132	1,354	947,874	1.20	837
Subalpine	1,933	1,019	156,522	.53	81
Meadow-Field	71				
All Upland	431,610	184,564	44,017,054	.43	102
Stream (Hand)	20,494	36,565	8,228,330	1.78	401
Stream (Slash)	576	4,994	288,000	8.67	500
Stream (Machine)	1,030	7,081	614,076	6.87	596
All Stream	22,100	48,640	9,130,406	2.20	413
All Types	453,710	233,204	53,147,460	.51	117

TABLE NO. 8B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Open Reproduction	23,359	22,476	3,787,943	.96	162
Dense Reproduction	2,327	2,175	188,872	.93	81
Open Pole	10,706	5,287	428,022	.49	40
Dense Pole	2,174	777	48,876	.36	22
Open Mature	4,147	2,349	266,075	.57	64
Dense Mature	601	198	18,073	.33	30
Cutover	2,052	4,672	1,392,284	2.28	679
Brush	596	347	27,842	.58	47
Subalpine	50	13	588	.26	12
Meadow-Field	10	1	72	.10	7
All Upland	46,022	38,295	6,158,647	.83	134
Stream (Hand)	4,810	7,946	898,432	1.65	187
All Types	50,832	46,241	7,057,079	.91	139

TABLE NO. 8C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Open Reproduction	1,984	2,412	125,921	1.22	63
Dense Pole	11	3	25	.27	2
Open Mature	29	25	450	.86	16
Brush	32	35	758	1.09	24
All Upland	2,056	2,475	127,154	1.20	62
Stream (Hand)	274	374	22,915	1.36	84
All Types	2,330	2,849	150,069	1.22	65

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1923-1940
KANIKSU OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes
Idaho	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	8,850	15,203	2,555,207	1.72	289
		FS-NIRA	72,135	23,866	6,432,376	.33	89
		EQ-ERA	79,577	47,328	8,120,331	.59	102
		FS-ERA	15,853	10,139	1,880,647	.64	119
		Cooperative	111,150	30,929	8,750,877	.28	79
		F-CCC	54,424	36,378	6,379,138	.67	117
		S&P-CCC	112	748	209,356	6.68	1,869
		Total	360,897	171,435	35,394,621	.48	99
	Second	FS-Reg.	4,504	2,455	446,758	.55	99
		FS-NIRA	8,544	2,051	292,658	.24	34
		EQ-ERA	13,207	13,788	2,571,725	1.04	195
		FS-ERA	2,737	2,767	182,793	1.01	67
		Cooperative	4,216	3,252	390,209	.77	93
		F-CCC	4,306	9,510	1,120,286	2.21	260
		S&P-CCC	3,577	3,842	743,055	1.07	208
		Total	41,091	37,665	5,747,484	.92	140
	Third	EQ-ERA	1,814	2,425	132,464	1.34	73
		Cooperative	324	72	7,092	.22	22
		Total	2,138	2,497	139,556	1.17	65
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	13,354	17,658	3,001,965	1.32	225
		FS-NIRA	80,679	25,917	6,725,034	.32	83
		EQ-ERA	94,598	63,541	10,824,520	.67	114
		FS-ERA	18,590	12,906	2,063,440	.69	111
		Cooperative	115,690	34,253	9,148,178	.30	79
		F-CCC	58,730	45,888	7,499,424	.78	128
		S&P-CCC	3,689	4,590	952,411	1.24	258
		Total	404,126	211,597	41,281,661	.52	102
Washington	First	FS-Reg.	8,594	10,080	4,100,764	1.17	477
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	34,417	12,708	3,858,496	.37	112
		EQ-ERA	3,328	5,844	2,190,917	1.76	658
		F-CCC	19,741	21,426	3,254,404	1.09	165
		Total	92,813	61,769	17,752,839	.67	191
	Second	FS-Reg.	3,829	2,238	717,619	.58	187
		EQ-ERA	1,376	1,381	204,383	1.00	149
		FS-ERA	1,949	1,678	154,764	.86	79
		F-CCC	2,587	3,279	232,829	1.27	90
		Total	9,741	8,576	1,309,595	.88	134
	Third	EQ-ERA	192	352	10,513	1.83	55
	All Workings	FS-Reg.	12,423	12,318	4,818,383	.99	388
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	34,417	12,708	3,858,496	.37	112
		EQ-ERA	4,896	7,577	2,405,813	1.55	491
		FS-ERA	1,949	1,678	154,764	.86	79
		F-CCC	22,328	24,705	3,487,233	1.11	156
		Total	102,746	70,697	19,072,947	.69	186
Idaho and Washington	First	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	17,444	25,283	6,655,971	1.45	382
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	106,552	36,574	10,290,872	.34	97
		EQ-ERA	82,905	53,172	10,311,248	.64	124
		FS-ERA	15,853	10,139	1,880,647	.64	119
		Cooperative	111,150	30,929	8,750,877	.28	79
		F-CCC	74,165	57,804	9,633,542	.78	130
		S&P-CCC	112	748	209,356	6.68	1,869
		Total	453,710	233,204	53,147,460	.51	117
	Second	FS-Reg.	8,333	4,693	1,164,377	.56	140
		FS-NIRA	8,544	2,051	292,658	.24	34
		EQ-ERA	14,583	15,169	2,776,108	1.04	190
		FS-ERA	4,686	4,445	337,557	.95	72
		Cooperative	4,216	3,252	390,209	.77	93
		F-CCC	6,893	12,789	1,353,115	1.86	196
		S&P-CCC	3,577	3,842	743,055	1.07	208
		Total	50,832	46,241	7,057,079	.91	139
	Third	EQ-ERA	2,006	2,777	142,977	1.38	71
		Cooperative	324	72	7,092	.22	22
		Total	2,330	2,849	150,069	1.22	64
	All Workings	EQ-Reg.	18,796	6,844	1,066,689	.36	57
		FS-Reg.	25,777	29,976	7,820,348	1.16	303
		EQ-NIRA	26,733	11,711	4,348,258	.44	163
		FS-NIRA	115,096	38,625	10,583,530	.34	92
		EQ-ERA	99,494	71,118	13,230,333	.71	133
		FS-ERA	20,539	14,584	2,218,204	.71	108
		Cooperative	115,690	34,253	9,148,178	.30	79
		F-CCC	81,058	70,593	10,986,657	.87	136
		S&P-CCC	3,689	4,590	952,411	1.24	258
		Total	506,872	282,294	60,354,608	.56	119

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1923-1940
KANIKSU OPERATION

State	Working	Number of Acres Worked by Ownership Classes					Total
		Federal			State	Private	
		Forest Service	Public Domain	Total			
Idaho	First	182,594	54	182,648	110,856	67,393	360,897
	Second	21,166		21,166	12,150	7,775	41,091
	Third	84		84	1,975	79	2,138
	All Workings	203,844	54	203,898	124,981	75,247	404,126
Washington	First	56,663		56,663	2,080	34,070	92,813
	Second	6,448		6,448		3,293	9,741
	Third					192	192
	All Workings	63,111		63,111	2,080	37,555	102,746
Idaho and Washington	First	239,257	54	239,311	112,936	101,463	453,710
	Second	27,614		27,614	12,150	11,068	50,832
	Third	84		84	1,975	271	2,330
	All Workings	266,955	54	267,009	127,061	112,802	506,872

TABLE NO. 11

PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1923-1940
KANIKSU OPERATION

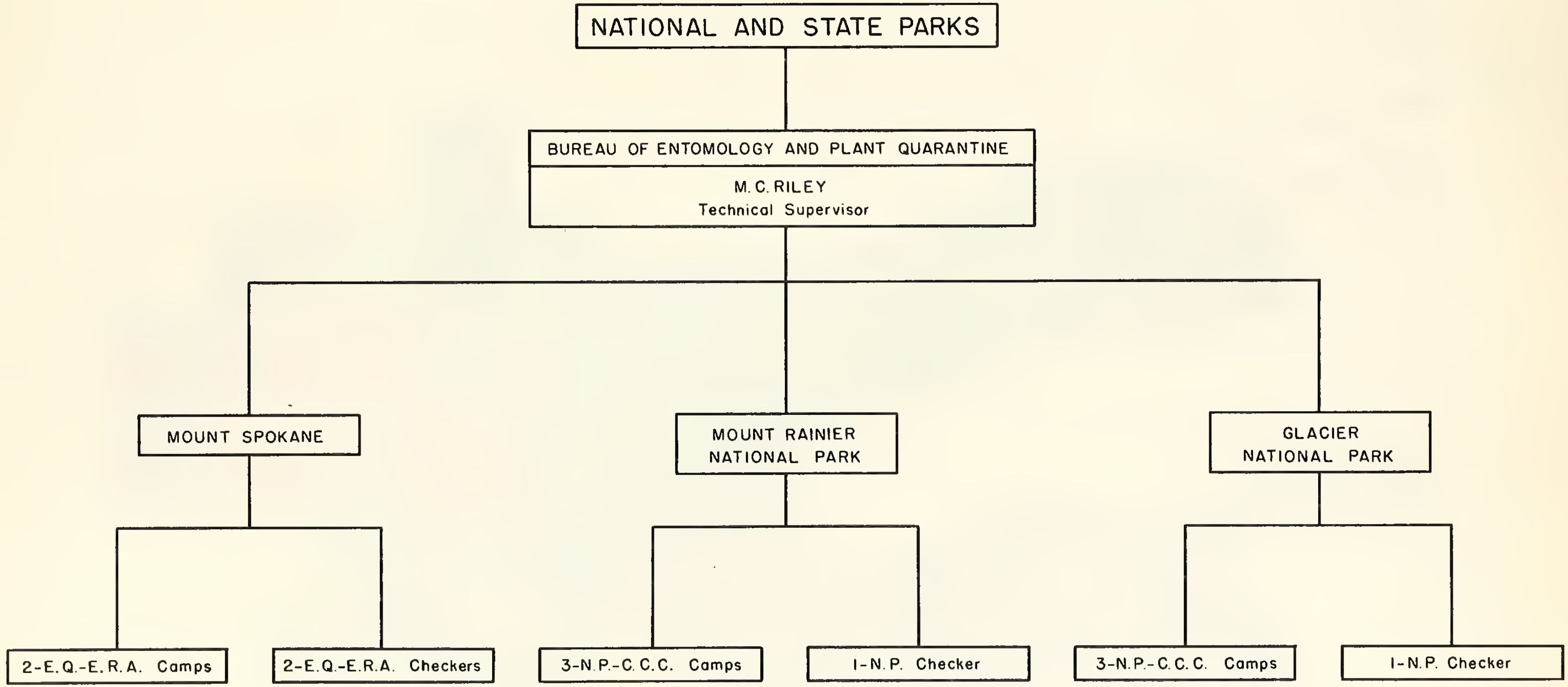
State	Ownership Class	Number of Acres		
		Worked	Unworked	Total
Idaho	Forest Service	182,594	72,291	254,885
	Public Domain	54	506	560
	Subtotal Federal	182,648	72,797	255,445
	State	110,856	17,614	128,470
	Private	67,393	50,317	117,710
	Total	360,897	140,728	501,625
Washington	Forest Service	56,663	35,227	91,890
	State	2,080	2,030	4,110
	Private	34,070	11,575	45,645
	Total	92,813	48,832	141,645
Idaho and Washington	Forest Service	239,257	107,518	346,775
	Public Domain	54	506	560
	Subtotal Federal	239,311	108,024	347,335
	State	112,936	19,644	132,580
	Private	101,463	61,892	163,355
	Total	453,710	189,560	643,270

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1923-1940
KANIKSU OPERATION

Working	Eradication Type	Acres	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes inerme	Ribes irriguum	Ribes acerifolium	Total Ribes
First	Open Reproduction	134,361	7,712,665	20,543,969	158,106	2,947		28,417,687
	Dense Reproduction	22,524	1,234,765	398,962	66,295			1,700,022
	Open Pole	98,102	2,415,725	2,604,157	186,047	21,192	3,914	5,231,035
	Dense Pole	21,327	268,016	111,257	22,388	522		402,183
	Open Mature	109,927	3,694,817	1,519,483	122,722		2,027	5,339,049
	Dense Mature	31,047	295,808	87,912	31,739			415,459
	Cutover	7,587	486,080	540,032	45,004			1,071,116
	Brush	3,599	68,387	203,158	64,562			336,107
	Burn	1,132	153,516	790,402	3,956			947,874
	Subalpine	1,933	116,392	40,111	19			156,522
	Meadow-Field	71						
	All Upland	431,610	16,446,171	26,839,443	700,838	24,661	5,941	44,017,054
	Stream	22,100	4,836,066	419,813	3,854,943		19,584	9,130,406
	All Types	453,710	21,282,237	27,259,256	4,555,781	24,661	25,525	53,147,460
Second	Open Reproduction	23,359	1,005,931	2,759,927	22,085			3,787,943
	Dense Reproduction	2,327	133,367	53,987	1,518			188,872
	Open Pole	10,706	211,080	209,095	7,847			428,022
	Dense Pole	2,174	38,839	7,561	2,476			48,876
	Open Mature	4,147	132,466	130,393	3,216			266,075
	Dense Mature	601	13,802	3,613	658			18,073
	Cutover	2,052	333,606	1,050,317	8,361			1,392,284
	Brush	596	15,641	11,326	875			27,842
	Subalpine	50	461	127				588
	Meadow-Field	10	72					72
	All Upland	46,022	1,885,265	4,226,346	47,036			6,158,647
	Stream	4,810	459,595	42,981	395,856			898,432
	All Types	50,832	2,344,860	4,269,327	442,892			7,057,079
Third	Open Reproduction	1,984	47,127	78,425	369			125,921
	Dense Pole	11	20	5				25
	Open Mature	29	150	300				450
	Brush	32	158	600				758
	All Upland	2,056	47,455	79,330	369			127,154
	Stream	274	20,044	2,871				22,915
	All Types	2,330	67,499	82,201	369			150,069
All Workings	Open Reproduction	159,704	8,765,723	23,382,321	180,560	2,947		32,331,551
	Dense Reproduction	24,851	1,368,132	452,949	67,813			1,888,894
	Open Pole	108,808	2,626,805	2,813,252	193,894	21,192	3,914	5,659,057
	Dense Pole	23,512	306,875	118,823	24,864	522		451,084
	Open Mature	114,103	3,827,433	1,650,176	125,938		2,027	5,605,574
	Dense Mature	31,648	309,610	91,525	32,397			433,532
	Cutover	9,639	819,686	1,590,349	53,365			2,463,400
	Brush	4,227	84,186	215,084	65,437			364,707
	Burn	1,132	153,516	790,402	3,956			947,874
	Subalpine	1,983	116,853	40,238	19			157,110
	Meadow-Field	81	72					72
	All Upland	479,688	18,378,891	31,145,119	748,243	24,661	5,941	50,302,855
	Stream	27,184	5,315,705	465,665	4,250,799		19,584	10,051,753
	All Types	506,872	23,694,596	31,610,784	4,999,042	24,661	25,525	60,354,608

ORGANIZATION CHART



E.Q.-E.R.A.
Number of Camps - 2
Number of Men - 130

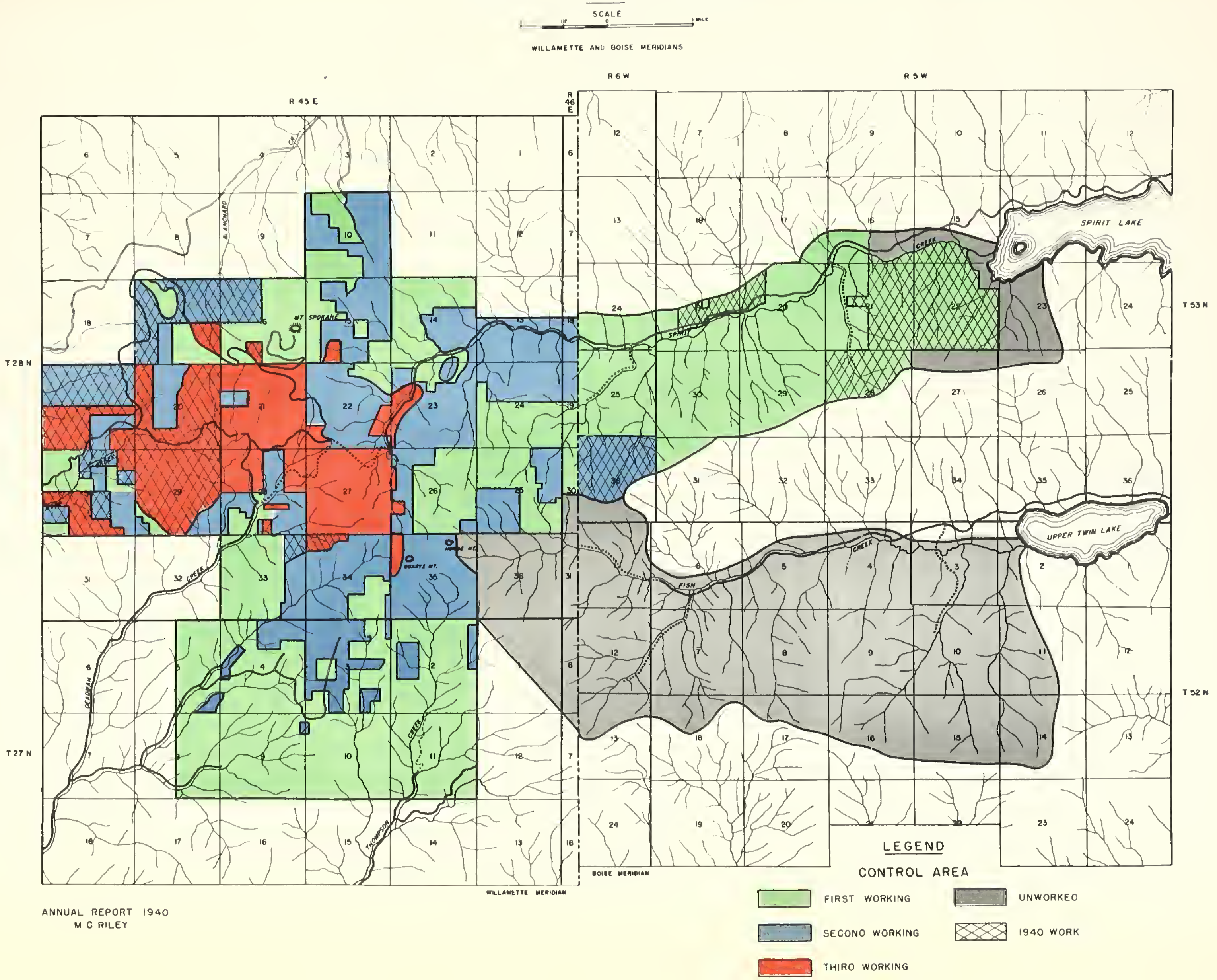
N.P.-C.C.C.
Number of Camps - 3
Number of Men - 95

N.P.-C.C.C.
Number of Camps - 3
Number of Men - 90

Total Number of Men on Blister Rust Work - 315

MT. SPOKANE OPERATION

BLISTER RUST CONTROL WORKING AREA



ANNUAL REPORT 1940
M C RILEY

RIBES ERADICATION, MOUNT SPOKANE OPERATION, 1940

By
M. C. Riley
Associate Forester

INTRODUCTION

Blister rust control work on the Mount Spokane operation during the 1940 field season consisted of a continuation of the work started in 1935. Initial working has been completed on practically all of that portion of the control area within the state of Washington while for the entire operation approximately 65 per cent of the area has been given initial treatment. One 45-man ERA camp worked in Washington and one 90-man camp worked in Idaho.

The first camp opened on May 1, and closed on September 30, and the last camp opened on May 8, and closed on October 15. There was considerably less loss of time due to turnover, fire and rain than has been experienced in previous years. This made it possible to slightly exceed the acreage quota established at the start of the season even though the entire man-day quota was not used.

ORGANIZATION AND ADMINISTRATION

The camps on the Mount Spokane operation were financed entirely by funds allotted to the Division of Plant Disease Control under the Emergency Relief Act. The only cooperators were owners of small parcels of land who donated the use of camp sites, since none of the lands are a part of any cooperating timber protective agency or National Forest administrative unit.

Due to the employment limitations it was not possible to employ a unit supervisor as has been done previously. The time of the operation supervisor was divided about equally between the Mount Spokane and the Mount Rainier and Glacier National Park operations as illustrated in the accompanying organization chart.

LOCATION AND DESCRIPTION OF AREA

The work in Washington centered around Mount Spokane on the headwaters of Deep and Deadman Creeks on areas originally worked during the period of 1935-1938. The work in Idaho was on the Spirit Creek drainage adjoining work done there in 1939. In addition some second working was done in Idaho where white pine reproduction was heavily infected on an area which originally supported a heavy ribes population. The general description of the area as given in previous reports applies to that worked this year.

Ribes viscosissimum, *R. lacustre* and *R. inerme* were the species found during the course of the season with approximately 10 per cent being *R. inerme* and the remainder about evenly divided between the other two species. This is the first time that *R. viscosissimum* has not been defi-

nitely predominating and is due to the fact that in the Idaho area the work is approaching the limits of the control area and as the white pine diminishes the R. lacustre increases.

The infection picture has not changed appreciably during the past year. Strips run by the pine disease survey crew and examinations made during the course of ribes eradication revealed a small number of new spot infections but the general distribution of the rust was not enlarged by these findings and no new large infection centers were found.

All classes of working and ribes conditions were encountered although in general neither was as severe as in past seasons. Where first working was performed some ribes-free area was found and the second and third working found fewer ribes than has been the case in former years. In some of the open pole type it is apparent that the disturbance caused by eradicators walking over the ground has encouraged ribes germination although as the stand becomes closed these bushes will be suppressed.

METHODS AND EQUIPMENT

As in previous years, all eradication was performed by the hand pulling method. It was the constant aim of all concerned to employ any new idea or modification of usual methods in order to effect any reduction in costs or increased efficiency. Special training was given to rework crews and selected personnel was used in training labor replacements. The practice of laying string lines in advance of crews was used wherever possible although it was not feasible to do this on some of the areas of second and third working.

CHECKING

Checking work was conducted on the basis of a four per cent sample to give the eradication forces immediate and detailed information on the areas. All areas worked were first given an advance survey in order to establish type lines, show ribes population and working conditions. Whenever possible the checkers assisted the camp bosses in laying out crew divisions, assisting with rework areas and helping supervise regular eradication work.

A total of 4,169 acres was covered by regular check. Some of the late season work was not checked because it was felt that a complete eradication had not been secured. During the course of the season approximately 4,650 acres were covered on post check and, aside from worked areas, approximately 1,150 acres were covered by an advance check.

On the basis of time spent on activities directly connected with checking, the cost of regular check was $0.12 per acre, that of advance check was $0.07 per acre and for post check the cost was $0.11 per acre.

STATEMENT OF EXPENDITURES AND COSTS

The statement of expenditures and costs is shown in the following tables:

TABLE NO. 1

EXPENDITURES BY APPROPRIATIONS, CALENDAR YEAR 1940
MOUNT SPOKANE OPERATION

Cooperating Agency	Appropriation	Amount		
Bureau of Entomology and Plant Quarantine	Regular			$ 2,252.00
	ERA	Idaho	$24,543.61	
		Wash.	13,835.37	
				38,378.98
	Total			40,630.98
Total Expenditures	All Appropriations			$40,630.98

TABLE NO. 2

CLASSIFIED EXPENDITURES, CALENDAR YEAR 1940
MOUNT SPOKANE OPERATION

Item	Bureau of Entomology and Plant Quarantine		
	Regular	ERA	Total
Salaries, permanent men	$2,200.00		$ 2,200.00
Salaries, temporary men		$ 4,308.94	4,308.94
Wages, temporary laborers	52.00	28,017.48	28,069.48
Subsistence supplies		4,612.17	4,612.17
Equipment		251.66	251.66
Travel and transportation		584.83	584.83
Other Expenses		603.90	603.90
Total	$2,252.00	$38,378.98	$40,630.98

Effective 8-hour man day cost $5.97
Number meals served 35,021 - Average cost per meal $0.147
Pounds of twine 1,121

SUMMARY OF RIBES ERADICATION, 1940
MOUNT SPOKANE OPERATION

TABLE NO. 3 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes	Ribes Remaining Per Acre	
							Bushes	Live Stem
Open Reproduction	588	737	370	1,695	3,314	563,100	1.9	3.4
Open Pole	598	770	1,133	2,501	2,800	413,613	2.3	3.3
Dense Pole	131	72	11	214	61	5,732	.4	.7
Open Mature		49		49	64	7,427	2.5	6.5
Brush			95	95	47	1,357	.3	.3
All Upland	1,317	1,628	1,609	4,554	6,286	991,229	2.0	3.2
Stream (Hand)	49	8		57	522	137,997	4.0	8.0
All Types	1,366	1,636	1,609	4,611	6,808	1,129,226	2.0	3.2

TABLE NO. 3A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
				Man Days	Ribes	Bushes	Live Stem
Open Reproduction	588	2,122	387,581	3.61	659	1.5	5.2
Open Pole	598	1,300	241,707	2.17	404	2.8	8.4
Dense Pole	131	14	1,427	.11	11		
All Upland	1,317	3,436	630,715	2.61	479	1.9	6.0
Stream (Hand)	49	506	137,177	10.33	2,800	4.7	9.4
All Types	1,366	3,942	767,892	2.89	562	2.0	6.1

TABLE NO. 3B - SECOND WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes	Ribes Remaining Bushes	Ribes Remaining Live Stem
Open Reproduction	737	904	92,844	1.23	126	2.0	3.0
Open Pole	770	705	93,205	.92	121	4.1	3.6
Dense Pole	72	37	3,919	.51	54	.7	1.7
Open Mature	49	64	7,427	1.31	152	2.5	6.5
All Upland	1,628	1,710	197,395	1.05	121	2.9	3.3
Stream (Hand)	8	16	820	2.00	103		
All Types	1,636	1,726	198,215	1.06	121	2.9	3.3

TABLE NO. 3C - THIRD WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis Man Days	Per Acre Basis Ribes	Ribes Remaining Bushes	Ribes Remaining Live Stem
Open Reproduction	370	288	82,675	.78	223	2.3	.6
Open Pole	1,133	795	78,701	.70	69	.9	.9
Dense Pole	11	10	386	.91	35	2.5	2.5
Brush	95	47	1,357	.50	14	.3	.3
All Types	1,609	1,140	163,119	.71	101	1.2	.8

TABLE NO. 4

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1940
MOUNT SPOKANE OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis		Ribes Remaining Per Acre	
						Man Days	Ribes	Bushes	Live Stem
Idaho	First	EQ-ERA	1,366	3,942	767,892	2.89	562	2.0	6.1
	Second	EQ-ERA	535	708	75,761	1.32	142	.5	3.2
	All Workings	EQ-ERA	1,901	4,650	843,653	2.45	444	1.6	5.4
Washington	Second	EQ-ERA	1,101	1,018	122,454	.92	111	3.8	3.4
	Third	EQ-ERA	1,609	1,140	163,119	.71	101	1.2	.8
	All Workings	EQ-ERA	2,710	2,158	285,573	.80	105	2.3	1.9
Idaho and Washington	First	EQ-ERA	1,366	3,942	767,892	2.89	562	2.0	6.1
	Second	EQ-ERA	1,636	1,726	198,215	1.06	121	2.9	3.3
	Third	EQ-ERA	1,609	1,140	163,119	.71	101	1.2	.8
	All Workings	EQ-ERA	4,611	6,808	1,129,226	1.48	245	2.0	3.2

TABLE NO. 5

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1940
MOUNT SPOKANE OPERATION

State	Working	Number of Acres Worked by Bureau of Entomology and Plant Quarantine					Total
		Federal			State	Private	
		Forest Service	Public Domain	Total			
Idaho	First	190	90	280	91	995	1,366
	Second				409	126	535
	Total	190	90	280	500	1,121	1,901
Washington	Second				992	109	1,101
	Third				920	689	1,609
	Total				1,912	798	2,710
Total	First	190	90	280	91	995	1,366
	Second				1,401	235	1,636
	Third				920	689	1,609
	Total	190	90	280	2,412	1,919	4,611

TABLE NO. 6

RESULTS OF CHECKING ON AREAS WORKED, 1940
MOUNT SPOKANE OPERATION

Eradication Type	Average Results for all Areas			
	Acres in Checked Area	Acres Checked	Ribes per Acre	
			Bushes	Live Stem
Open Reproduction	1,510	60.3	1.9	3.4
Open Pole	2,261	90.4	2.3	3.3
Dense Pole	203	8.1	.4	.7
Open Mature	49	2.0	2.5	6.5
Brush	95	3.8	.3	.3
All Upland	4,118	164.6	2.0	3.2
Stream (Hand)	51	2.0	4.0	8.0
All Types	4,169	166.6	2.0	3.2

TABLE NO. 7

TOTAL RIBES BY SPECIES ERADICATED, 1940
MOUNT SPOKANE OPERATION

Working	Eradication Type	Acres	Ribes by Species			Total Ribes
			Ribes lacustre	Ribes viscosissimum	Ribes inerme	
First	Open Reproduction	588	206,195	181,386		387,581
	Open Pole	598	143,302	98,405		241,707
	Dense Pole	131	579	848		1,427
	All Upland	1,317	350,076	280,639		630,715
	Stream	49	18,444	589	118,144	137,177
	All Types	1,366	368,520	281,228	118,144	767,892
Second	Open Reproduction	737	38,952	53,892		92,844
	Open Pole	770	37,238	55,967		93,205
	Dense Pole	72	705	3,214		3,919
	Open Mature	49	709	6,718		7,427
	All Upland	1,628	77,604	119,791		197,395
	Stream	8	757	63		820
	All Types	1,636	78,361	119,854		198,215
Third	Open Reproduction	370	18,908	63,767		82,675
	Open Pole	1,133	36,549	42,152		78,701
	Dense Pole	11	154	232		386
	Brush	95	379	978		1,357
	All Types	1,609	55,990	107,129		163,119
All Workings	Open Reproduction	1,695	264,055	299,045		563,100
	Open Pole	2,501	217,089	196,524		413,613
	Dense Pole	214	1,438	4,294		5,732
	Open Mature	49	709	6,718		7,427
	Brush	95	379	978		1,357
	All Upland	4,554	483,670	507,559		991,229
	Stream	57	19,201	652	118,144	137,997
	All Types	4,611	502,871	508,211	118,144	1,129,226

SUMMARY OF RIBES ERADICATION, 1935-1940
MOUNT SPOKANE OPERATION

TABLE NO. 8 - SUMMARY OF ALL WORKINGS

Eradication Type	Acres First Working	Acres Second Working	Acres Third Working	Total Acres	Effective Man Days	Total Ribes
Open Reproduction	8,032	3,817	1,358	13,207	28,655	8,336,692
Dense Reproduction	376	215	69	660	952	260,655
Open Pole	8,932	3,920	1,612	14,464	15,751	3,858,418
Dense Pole	754	231	11	996	463	75,619
Open Mature	1,076	727	131	1,934	3,546	730,656
Dense Mature	735	102		837	185	34,017
Cutover	526	760	186	1,472	2,015	972,489
Brush	1,924	601	255	2,780	3,021	394,391
Subalpine	515	181	88	784	502	100,944
All Upland	22,870	10,554	3,710	37,134	55,090	14,763,881
Stream (Hand)	507	222		729	3,334	1,049,558
All Types	23,377	10,776	3,710	37,863	58,424	15,813,439

TABLE NO. 8A - FIRST WORKING

Eradication Type	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
				Man Days	Ribes
Open Reproduction	8,032	23,220	7,196,194	2.89	896
Dense Reproduction	376	592	170,078	1.57	452
Open Pole	8,932	11,407	3,114,515	1.28	349
Dense Pole	754	331	59,815	.44	79
Open Mature	1,076	2,667	542,489	2.48	504
Dense Mature	735	165	33,155	.22	45
Cutover	526	710	236,846	1.35	450
Brush	1,924	1,923	289,058	1.00	150
Subalpine	515	334	85,746	.65	166
All Upland	22,870	41,349	11,727,896	1.81	513
Stream (Hand)	507	2,962	990,922	5.84	1,955
All Types	23,377	44,311	12,718,818	1.90	544
TABLE NO. 8B - SECOND WORKING					
Open Reproduction	3,817	4,295	820,982	1.13	215
Dense Reproduction	215	290	61,681	1.35	287
Open Pole	3,920	3,290	593,085	.84	151
Dense Pole	231	122	15,418	.53	67
Open Mature	727	770	161,095	1.06	222
Dense Mature	102	20	862	.20	9
Cutover	760	1,092	669,650	1.44	881
Brush	601	947	88,180	1.58	147
Subalpine	181	129	9,850	.71	54
All Upland	10,554	10,955	2,420,803	1.04	229
Stream (Hand)	222	372	58,636	1.68	264
All Types	10,776	11,327	2,479,439	1.05	230
TABLE NO. 8C - THIRD WORKING					
Open Reproduction	1,358	1,140	319,516	.84	235
Dense Reproduction	69	70	28,896	1.01	419
Open Pole	1,612	1,054	150,818	.65	94
Dense Pole	11	10	386	.91	35
Open Mature	131	109	27,072	.83	207
Cutover	186	213	65,993	1.15	355
Brush	255	151	17,153	.59	67
Subalpine	88	39	5,348	.44	61
All Types	3,710	2,786	615,182	.75	166

TABLE NO. 9

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1935-1940
MOUNT SPOKANE OPERATION

State	Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
						Man Days	Ribes
Idaho	First	EQ-ERA	5,282	14,974	4,835,292	2.83	915
	Second	EQ-ERA	535	708	75,761	1.32	142
	All Workings	EQ-ERA	5,817	15,682	4,911,053	2.70	844
Washington	First	EQ-ERA	18,095	29,337	7,883,526	1.62	436
	Second	EQ-ERA	10,241	10,619	2,403,678	1.04	235
	Third	EQ-ERA	3,710	2,786	615,182	.75	166
	All Workings	EQ-ERA	32,046	42,742	10,902,386	1.33	340
Idaho and Washington	First	EQ-ERA	23,377	44,311	12,718,818	1.90	544
	Second	EQ-ERA	10,776	11,327	2,479,439	1.05	230
	Third	EQ-ERA	3,710	2,786	615,182	.75	166
	All Workings	EQ-ERA	37,863	58,424	15,813,439	1.54	418

TABLE NO. 10

OWNERSHIP OF LAND COVERED ON RIBES ERADICATION, 1935-1940
MOUNT SPOKANE OPERATION

State	Working	Number of Acres Worked by Ownership Classes					Total
		Federal					
		Forest Service	Public Domain	Total	State	Private	
Idaho	First	310	170	480	1,258	3,544	5,282
	Second				409	126	535
	Total	310	170	480	1,667	3,670	5,817
Washington	First		315	315	4,752	13,028	18,095
	Second		60	60	3,935	6,246	10,241
	Third				2,114	1,596	3,710
	Total		375	375	10,801	20,870	32,046
Total	First	310	485	795	6,010	16,572	23,377
	Second		60	60	4,344	6,372	10,776
	Third				2,114	1,596	3,710
	Total	310	545	855	12,468	24,540	37,863

TABLE NO. 11

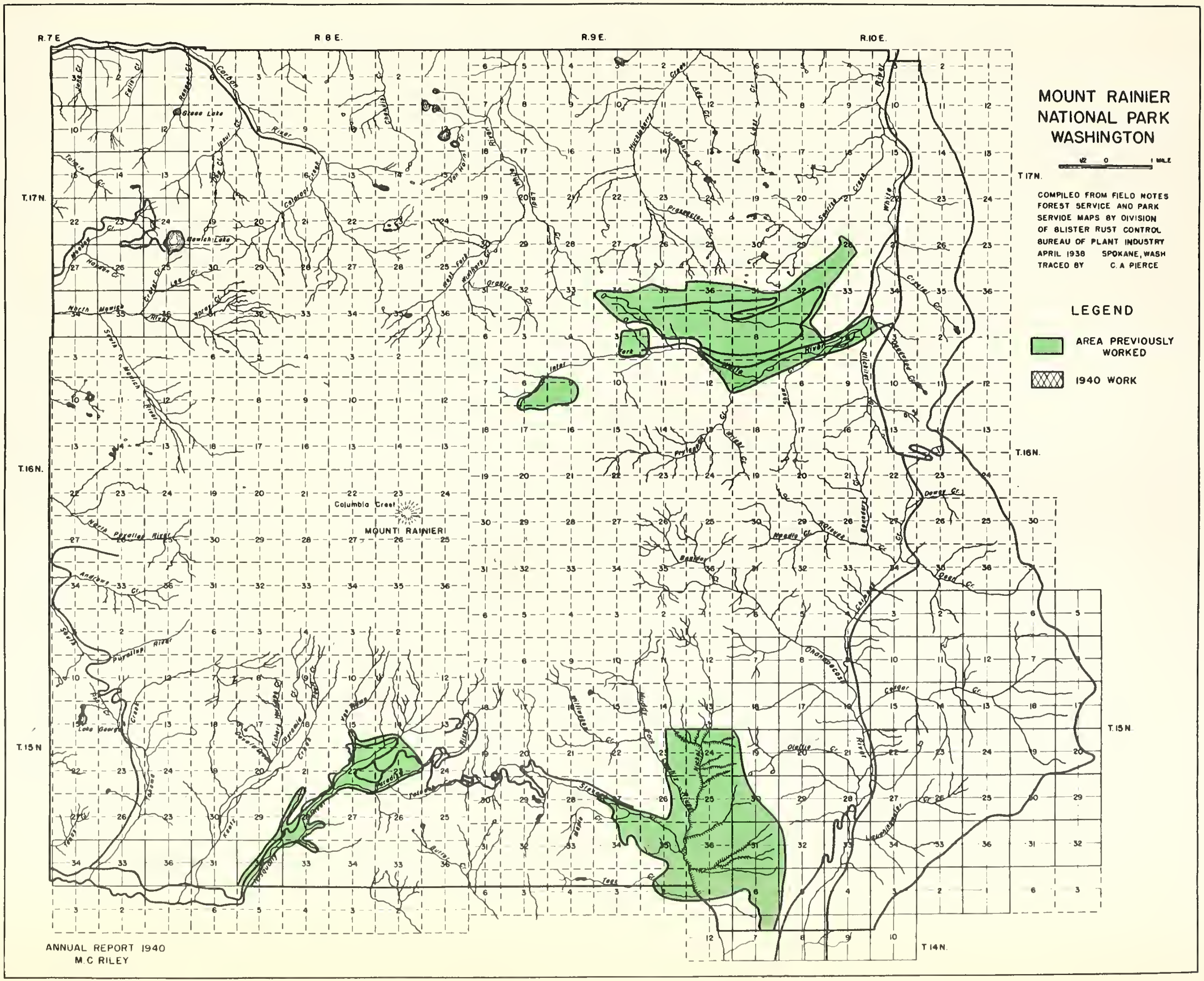
PROGRESS OF FIRST WORKING BY OWNERSHIP CLASSES, 1935-1940
MOUNT SPOKANE OPERATION

State	Ownership Class	Number of Acres		
		Worked	Unworked	Total
Idaho	Forest Service	310	80	390
	Public Domain	170	255	425
	Subtotal Federal	480	335	815
	State	1,258	467	1,725
	Private	3,544	9,426	12,970
	Total	5,282	10,228	15,510
Washington	Public Domain	315		315
	State	4,752	988	5,740
	Private	13,028	367	13,395
	Total	18,095	1,355	19,450
Total	Forest Service	310	80	390
	Public Domain	485	255	740
	Subtotal Federal	795	335	1,130
	State	6,010	1,455	7,465
	Private	16,572	9,793	26,365
	Total	23,377	11,583	34,960

TABLE NO. 12

TOTAL RIBES BY SPECIES ERADICATED, 1935-1940
MOUNT SPOKANE OPERATION

Working	Eradication Type	Acres	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes inerme	Total Ribes
First	Open Reproduction	8,032	2,185,192	4,998,337	12,665	7,196,194
	Dense Reproduction	376	145,551	24,527		170,078
	Open Pole	8,932	1,503,900	1,610,615		3,114,515
	Dense Pole	754	34,973	24,842		59,815
	Open Mature	1,076	259,455	283,034		542,489
	Dense Mature	735	11,281	21,874		33,155
	Cutover	526	136,659	100,187		236,846
	Brush	1,924	85,890	203,168		289,058
	Subalpine	515	46,423	39,323		85,746
	All Upland	22,870	4,409,324	7,305,907	12,665	11,727,896
	Stream	507	690,118	67,807	232,997	990,922
	All Types	23,377	5,099,442	7,373,714	245,662	12,718,818
Second	Open Reproduction	3,817	235,399	585,583		820,982
	Dense Reproduction	215	52,484	9,197		61,681
	Open Pole	3,920	244,086	348,999		593,085
	Dense Pole	231	6,476	8,942		15,418
	Open Mature	727	48,455	112,640		161,095
	Dense Mature	102	463	399		862
	Cutover	760	340,267	329,383		669,650
	Brush	601	40,465	47,715		88,180
	Subalpine	181	4,970	4,880		9,850
	All Upland	10,554	973,065	1,447,738		2,420,803
	Stream	222	55,319	3,317		58,636
	All Types	10,776	1,028,384	1,451,055		2,479,439
Third	Open Reproduction	1,358	142,121	177,395		319,516
	Dense Reproduction	69	23,526	5,370		28,896
	Open Pole	1,612	66,963	83,855		150,818
	Dense Pole	11	154	232		386
	Open Mature	131	8,736	18,336		27,072
	Cutover	186	49,466	16,527		65,993
	Brush	255	4,757	12,396		17,153
	Subalpine	88	2,510	2,838		5,348
	All Types	3,710	298,233	316,949		615,182
All Workings	Open Reproduction	13,207	2,562,712	5,761,315	12,665	8,336,692
	Dense Reproduction	660	221,561	39,094		260,655
	Open Pole	14,464	1,814,949	2,043,469		3,858,418
	Dense Pole	996	41,603	34,016		75,619
	Open Mature	1,934	316,646	414,010		730,656
	Dense Mature	837	11,744	22,273		34,017
	Cutover	1,472	526,392	446,097		972,489
	Brush	2,780	131,112	263,279		394,391
	Subalpine	784	53,903	47,041		100,944
	All Upland	37,134	5,680,622	9,070,594	12,665	14,763,881
	Stream	729	745,437	71,124	232,997	1,049,558
	All Types	37,863	6,426,059	9,141,718	245,662	15,813,439


MOUNT RAINIER
NATIONAL PARK
WASHINGTON
COMPILED FROM FIELD NOTES
FOREST SERVICE AND PARK
SERVICE MAPS BY DIVISION
OF BLISTER RUST CONTROL
BUREAU OF PLANT INDUSTRY
APRIL 1938 SPOKANE, WASH
TRACED BY C. A PIERCE
LEGEND
AREA PREVIOUSLY WORKED
1940 WORK
R.7 E.
R.8 E.
R.9 E.
R.10 E.
T.17 N.
T.16 N.
T.15 N.
T.14 N.
MOUNT RAINIER
Columbia Crest
ANNUAL REPORT 1940
M.C RILEY

WHITE PINE BLISTER RUST CONTROL
MOUNT RAINIER NATIONAL PARK, 1940

By
M. C. Riley
Associate Forester

Ribes eradication on Mount Rainier National Park during the 1940 field season was performed by CCC enrollees occupying three side camps, all located on the Stevens Canyon area. Men for two of the side camps were from the main camp at Packwood and those in the third side camp were from the new main camp at Nisqually. At the height of the season there were approximately 105 men in these camps., The side camps were located at Alder Flats, Nickle Creek and on the Cowlitz River near Canyon Bridge.

Considerable delay was experienced in getting the work started due to lack of men, failure to concentrate on camp building and poor packing facilities. The first camp started work June 17. Unfortunately, one side camp was not occupied until August 20, even though much stress had been placed on the urgency of the work because of severe infection conditions. As a result this crew had only one month in the field. All camps closed on about September 20.

All crews were engaged in second and third working. The Nickle Creek camp was the only one to complete its area, the other two camps having considerable work left undone. The camp on the Cowlitz River should be used again next season while the work on the Alder Flats area can probably be done from a main camp at Packwood.

A checker was employed for slightly over two months. Due to the late start of ribes eradication and the need for his services in building camps and training men, practically no checking work was done.

A representative of the Bureau of Entomology and Plant Quarantine helped plan and supervise the work. This Bureau also supplied the necessary forms and office supplies for the proper recording and reporting of data.

Considerable time was spent by representatives of the Bureau in cutting blister rust cankers from infected trees. The majority of this work was done on *Pinus albicaulis* on the White River area. An infection center near Sunrise Point was cleaned up and scattered cankers in some portions of the rest of the area were removed, but more of this work remains to be done. A few cankers were also removed from the Longmire area. Some of these cankers are apparently traceable to the introduction of ribes seeds in soil used in rehabilitating the area and some ribes are being introduced inadvertently when hardwoods are transplanted there from other areas.

For the 1941 season it is imperative that the work in Stevens Canyon be continued, a crew is necessary to rework the White River area and complete the canker removal, and work should be done on the Longmire area, the amount depending upon the results of an early season check.

In directing the work on Mount Rainier National Park during the 1940 field season, the Bureau of Entomology and Plant Quarantine expended a total of $819.38 for travel, expenses and supervisory time.

The following tables show the results of the ribes eradication work for the 1940 season and cumulative results of all work done to date:

TABLE NO. 1

SUMMARY OF RIBES ERADICATION, 1940
MOUNT RAINIER NATIONAL PARK

Area	Working	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes sanguineum	Total Ribes	Per Acre Basis: Man Days	Per Acre Basis: Ribes
Stevens Canyon	Second	Stream	274	842	7,924	95	24,648	601	33,268	3.07	121
	Third	Stream	183	443	712		21,651		22,363	2.42	122
	Total	Stream	457	1,285	8,636	95	46,299	601	55,631	2.81	122

TABLE NO. 2

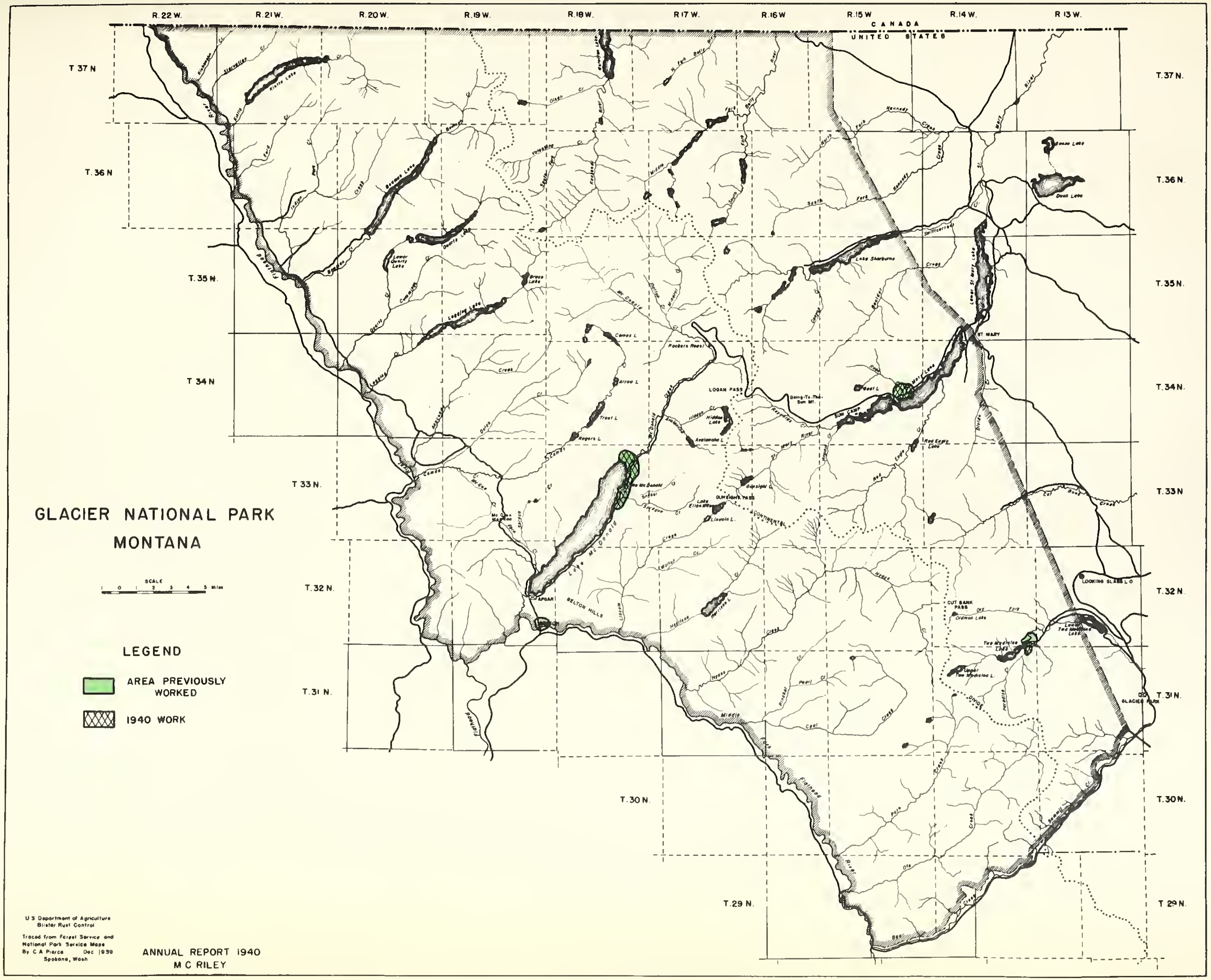
SUMMARY OF RIBES ERADICATION, 1930-1940
MOUNT RAINIER NATIONAL PARK

Working	Area	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes bracteosum	Ribes watsonianum	Ribes laxiflorum	Ribes acerifolium	Ribes sanguineum	Ribes triste	Total Ribes	Per Acre Basis: Man Days	Per Acre Basis: Ribes
First	Longmire	Open Reproduction	274	397	40,281		1,101		5,409	5,804			52,595	1.45	192
		Stream	626	1,202	185,687		97,774		53,899	2,838	16		340,214	1.92	543
		All Types	900	1,599	225,968		98,875		59,308	8,542	15		392,809	1.78	436
	Stevens Canyon	Open Reproduction	2,351	218	28,071		15,985				7,915		61,972	.09	22
		Open Pole	704	38	176		1,052				16		1,244	.05	2
		All Upland	3,055	256	28,247		17,038				7,931		53,216	.08	17
		Stream	1,192	4,741	72,360	2,055	440,386		914	11	3,959		519,685	3.98	436
		All Types	4,247	4,997	100,607	2,055	457,424		914	11	11,890		572,901	1.18	135
	White River	Open Reproduction	66	50	6,859	239	21	1,133	550	194			9,005	.76	136
		Open Pole	1,870	2,087	173,780	69,529	539	139,238	1,189	10,801	91	744	395,911	1.12	212
		Open Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	2,258	2,401	207,975	82,515	560	140,371	1,744	11,040	91	744	445,141	1.06	197
		Stream	423	744	152,856	1,510	4,869	242	8,820	188	98	8	178,591	1.76	422
		All Types	2,681	3,145	370,832	84,125	5,429	140,513	10,564	11,228	189	752	623,732	1.17	233
	Starbo	Open Reproduction	48	21	68	7		7		2,305			2,387	.44	50
		Open Pole	332	262	11,275	6,131		6,723	3,221	16,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		5,730	3,221	18,963			46,396	.74	122
		Stream	48	46	2,563	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,208	3,757	19,372			51,065	.77	120
	All Areas	Open Reproduction	2,739	686	75,289	246	17,108	1,140	6,959	8,303	7,915		115,960	.25	42
		Open Pole	2,906	2,397	185,232	75,560	1,591	145,961	4,410	27,459	107	744	441,164	.82	152
		Open Mature	322	264	27,327	12,847			5	45			40,224	.82	125
		All Upland	5,957	3,337	287,848	88,753	18,699	147,101	10,374	35,807	8,022	744	697,348	.56	100
		Stream	2,287	5,733	423,566	4,140	543,029	718	64,179	3,446	4,073	8	1,043,159	2.94	456
		All Types	8,254	10,070	711,414	92,893	551,728	147,819	74,553	39,253	12,095	752	1,640,507	1.22	199
Second	Loogmire	Open Reproduction	203	97	9,744		1,101						10,846	.48	53
		Stream	614	526	19,977		23,196		2,394	1,426	50		47,043	.86	77
		All Types	817	623	29,721		24,297		2,394	1,426	50		67,888	.75	71
	Stevene Canyon	Stream	745	2,128	49,113	95	140,792				507		190,607	2.85	256
	White River	Open Reproduction	66	12	221			77					298	.18	5
		Opeo Pole	1,914	1,573	36,284	14,297	2,178	5,849	15,095	33			75,734	.82	40
		Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,302	1,632	37,783	16,308	2,176	5,928	16,095	33			79,321	.71	35
		Stream	394	657	32,748		154		5				32,907	1.57	84
		All Types	2,595	2,289	70,531	16,308	2,330	5,926	16,100	33			112,228	.85	42
	All Areas	Open Reproduction	269	109	9,965		1,101	77					11,143	.41	41
		Open Pole	1,914	1,673	36,284	14,297	2,176	6,849	16,095	33			75,734	.82	40
		Open Mature	322	47	1,278	2,011							3,289	.15	10
		All Upland	2,505	1,729	47,527	16,308	3,277	6,925	16,095	33			90,166	.59	36
		Stream	1,753	3,311	101,838	95	164,142		2,399	1,425	657		270,557	1.89	154
		All Types	4,258	5,040	149,355	16,403	167,419	5,925	18,494	1,459	657		360,723	1.18	85
Third	Longmire	Stream	393	226	9,451		1,173		315		5		10,945	.58	28
	Stevens Canyon	Stream	220	551	712		23,384						24,096	2.50	110
	White River	Stream	478	279	13,281	2,253	34		703				15,271	.58	34
	All Areas	Stream	1,091	1,066	23,444	2,253	24,591		1,019		5		51,313	.97	47
All Workiogs	Longmire	Open Reproduction	477	494	50,025		2,202		5,409	5,804			53,440	1.04	133
		Stream	1,633	1,954	215,115		122,143		56,609	4,264	72		398,203	1.20	244
		All Types	2,110	2,448	266,140		124,345		62,018	10,068	72		461,643	1.15	219
	Stevens Canyon	Open Reproduction	2,361	218	28,071		15,985				7,915		51,972	.09	22
		Open Pole	704	38	175		1,052				16		1,244	.05	2
		All Upland	3,055	255	28,247		17,038				7,931		53,216	.08	17
		Stream	2,157	7,420	122,185	2,150	604,662		914	11	4,666		734,388	3.44	340
		All Types	5,212	7,575	150,432	2,150	621,600		914	11	12,497		787,604	1.47	151
	White River	Opeo Reproduction	132	62	7,090	239	21	1,210	550	194			9,304	.47	70
		Open Pole	3,784	3,560	210,064	83,826	2,715	145,087	17,284	10,834	91	744	471,645	.97	125
		Opeo Mature	644	311	28,505	14,858			5	46			43,513	.48	58
		All Upland	4,560	4,033	246,759	98,923	2,736	147,297	17,839	11,073	91	744	524,462	.88	115
		Stream	1,295	1,580	208,885	3,763	5,057	242	9,528	188	98	8	227,769	1.30	176
		All Types	6,855	6,713	454,644	102,686	7,793	147,539	27,367	11,261	189	752	752,231	.98	128
	Starbo	Open Reproduction	48	21	68	7		7		2,305			2,387	.44	50
		Opeo Pole	332	262	11,275	6,131		6,723	3,221	15,658			44,009	.79	133
		All Upland	380	283	11,344	6,138		6,730	3,221	18,963			46,396	.74	122
		Stream	46	46	2,563	575		476	546	409			4,669	1.00	102
		All Types	426	329	14,007	6,713		7,206	3,767	19,372			51,065	.77	120
	All Areas	Open Reproduction	3,008	795	85,254	246	18,209	1,217	6,959	8,303	7,915		127,103	.25	42
		Open Pole	4,820	3,960	221,516	89,957	3,767	152,810	20,505	27,492	107	744	516,898	.82	107
		Open Mature	544	311	28,605	14,858			5	45			43,513	.48	68
		All Upland	8,472	5,066	335,375	105,061	21,976	154,027	26,469	35,840	8,022	744	687,514	.60	81
		Stream	5,131	11,100	548,848	6,488	731,762	718	67,597	4,872	4,736	8	1,355,029	2.16	256
		All Types	13,603	16,156	884,223	111,549	753,738	154,745	94,056	40,712	12,758	752	2,052,543	1.19	151

TABLE NO. 3

SUMMARY OF RIBES ERADICATION BY CLASSES OF CAMPS, 1930-1940
MOUNT RAINIER NATIONAL PARK

Working	Class	Acres	Effective Man Days	Total Ribes	Per Acre Basis	
					Man Days	Ribes
First	NP-Reg.	2,647	3,806	780,171	1.44	295
	NP-CCC	5,607	6,264	860,336	1.12	154
	Total	8,254	10,070	1,640,507	1.22	199
Second	NP-Reg.	38	72	9,655	1.89	254
	NP-CCC	4,220	4,968	351,068	1.18	83
	Total	4,258	5,040	360,723	1.18	85
Third	NP-CCC	1,091	1,056	51,313	.97	47
All Workings	NP-Reg.	2,685	3,878	789,826	1.44	294
	NP-CCC	10,918	12,288	1,262,717	1.13	116
	Total	13,603	16,166	2,052,543	1.19	151


GLACIER NATIONAL PARK
MONTANA
LEGEND
AREA PREVIOUSLY WORKED
1940 WORK
ANNUAL REPORT 1940
M C RILEY
U S Department of Agriculture
Blister Rust Control
Traced from Forest Service and
National Park Service Maps
By C A Pierce Dec 1939
Spokane, Wash
CANADA
UNITED STATES
LOGAN PASS
ST MARY
APGAR
BELTON HILLS
LOOKING GLASS L.O.
CUT BANK PASS
GLACIER PARK

WHITE PINE BLISTER RUST CONTROL
GLACIER NATIONAL PARK, 1940

By
M. C. Riley
Associate Forester

Ribes eradication for the control of white pine blister rust on Glacier National Park during the 1940 field season was a continuation of the work started during 1939. The work was performed by CCC enrollees from main camps located at Belton, from which work was done at Lake McDonald; at St. Mary, which supplied men for the Roes Creek job, and the Two Medicine area was worked from a side camp from Many Glaciers.

Experienced blister rust men were used as foremen. A blister rust checker was employed for approximately the entire season. Besides doing regular checking work on areas sufficiently prepared for a check, he assisted the various foremen in training enrollees and in laying out the work and was able to clean up areas with spotted ribes occurrence where it would be inexpedient to send crews over the ground. The salary of the checker was paid by the Bureau of Entomology and Plant Quarantine until July 1, and thereafter by the National Park Service.

Inspections of white pine and ribes were made during the course of the season by representatives of the Bureau of Entomology and Plant Quarantine as well as by the CCC foremen but no infection was found. Individual bushes which were known to be infected in the two previous years showed no infection during 1940. No infection on white pine has been found in the Park.

In connection with the blister rust control work on Glacier National Park during the 1940 field season, the Bureau of Entomology and Plant Quarantine expended $808.37 for salaries, travel and supervisory time.

The general descriptions of the various areas where work was performed as regards ribes species, white pine, and working conditions are given in the 1939 annual report. There follows a brief summary of progress for each area involved in the 1940 program.

Two Medicine

Ribes eradication was started on this area in 1939 and the initial work was not completed during the 1940 field season. Due to delays beyond the control of local authorities work was not started until August 12, 1940. Approximately 40 men were in the field but considerable time was lost due to fire. The side camp was closed on September 30.

The majority of the time was spent on the portion of the area along the southwest side of the lake and initial coverage was completed there. Some work was also done in the stream type on the south side of the creek and from there to the main highway.

Some work remains to be done in the pine area south of the camp ground and in the protection area on the south side. The stream type portion of the area worked in 1939 should be given a second working in 1941.

Lake McDonald

A small portion of this area was worked at the end of the 1939 season and initial working was practically completed during 1940. Work was started on May 20, with approximately 20 men and continued, except for much interruption because of fire, until September 20. Initial working would have been completed here had not an exceptionally early frost made ribes identification difficult on one small, dry, exposed portion of the area northwest of the head of the lake.

Crew work was confined entirely to the ground north of the lake and west of McDonald Creek. The remainder was worked by the checker assisted by two picked men. This crew was able to remove the isolated clumps of ribes along the slope east of the lake as well as along the main highway, side streams flowing into Lake McDonald and in and around service roads and areas.

Roes Creek

Ribes eradication was done on this area for the first time in 1940. The work started on July 29 and was terminated on September 20. A maximum of 50 men were used on this area but the average number was about 25.

Practically all of the pine area has been worked north of the highway as well as a good portion of that between the highway and the lake. None of the protection strip has been worked. The worst concentrations of ribes have been removed but there still remains some rather severe working conditions in the canyon along Roes Creek.

RECOMMENDATIONS

In order to complete work already started, crews should be assigned to the Roes Creek and Two Medicine areas again in 1941. The crew which completes the Lake McDonald area should also do the necessary second working on the Belton area along the river and where some of the work done in 1939 on Belton Hills was of poor quality.

A checker should again be employed to do regular checking and to assist the foremen in laying out areas and in blocking out ribes-free ground.

The following tables show the results of the ribes eradication work for the 1940 season and accumulative results for all work done to date:

TABLE NO. 1

SUMMARY OF RIBES ERADICATION, 1940
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme	Total Ribes	Per Acre Basis: Man Days	Ribes
Two Medicine	Open Pole	100	92	2,779			1,070	3,849	.92	39
	Stream	21	317	16,363			7,054	23,417	15.10	1,151
	All Types	121	409	19,142			8,124	27,266	3.38	225
Lake McDonald	Open Mature	604	634	15,215	2,727	26,139		44,081	1.05	73
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,321	774	18,407	2,806	26,466		47,679	.59	36
	Stream	5	22	4,631	35			4,666	4.40	933
	All Types	1,326	796	23,038	2,841	26,466		52,345	.60	39
Roes Cr.	Open Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
All Areas	Open Pole	186	586	26,856	5,650	6,738	42,243	81,487	3.15	438
	Open Mature	604	634	15,215	2,727	26,139		44,081	1.05	73
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,507	1,360	45,263	8,456	33,204	42,243	129,166	.90	86
	Stream	26	339	20,994	35		7,054	28,083	13.04	1,080
	All Types	1,533	1,699	66,257	8,491	33,204	49,297	157,249	1.11	103

TABLE NO. 2

SUMMARY OF RIBES ERADICATION, 1939-1940
GLACIER NATIONAL PARK

Area	Eradication Type	Acres	Effective Man Days	Ribes by Species: Ribes lacustre	Ribes viscosissimum	Ribes setosum	Ribes inerme	Total Ribes	Per Acre Basis: Man Days	Ribes
Belton	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	284	122	13,428	15,364	8,967		37,759	.43	133
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	All Types	681	445	32,708	43,176	32,986		108,870	.65	160
Two Medicine	Open Pole	346	389	16,774	2,575	1,723	2,853	23,925	1.12	69
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	406	507	20,709	3,623	6,388	4,687	35,407	1.25	87
	Stream	49	464	28,325	434		12,315	41,074	9.47	838
	All Types	455	971	49,034	4,057	6,388	17,002	76,481	2.13	168
Lake McDonald	Open Mature	629	710	17,101	3,601	28,870		49,572	1.13	79
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	All Upland	1,346	850	20,293	3,680	29,197		53,170	.63	40
	Stream	5	22	4,631	35			4,666	4.40	933
	All Types	1,351	872	24,924	3,715	29,197		57,836	.65	43
Roes Cr.	Open Pole	86	494	24,077	5,650	6,738	41,173	77,638	5.74	903
All Areas	Open Reproduction	358	204	9,869	6,472	15,666		32,007	.57	89
	Open Pole	716	1,005	54,279	23,587	17,428	44,026	139,320	1.40	195
	Open Mature	629	710	17,101	3,601	28,870		49,572	1.13	79
	Dense Mature	717	140	3,192	79	327		3,598	.20	5
	Brush	39	119	9,411	21,340	8,353		39,104	3.05	1,003
	Subalpine	60	118	3,935	1,050	4,665	1,834	11,484	1.97	191
	All Upland	2,519	2,296	97,787	56,129	75,309	45,860	275,085	.91	109
	Stream	54	486	32,956	469		12,315	45,740	9.00	847
	All Types	2,573	2,782	130,743	56,598	75,309	58,175	320,825	1.08	125

SCOUTING FOR WHITE PINE BLISTER RUST IN YELLOWSTONE NATIONAL PARK, 1940

By

Edward L. Joy, Forester

Other than through occasional efforts to find white pine blister rust in and around Yellowstone National Park during the pine-ribes survey work of 1934 and the experimental ribes eradication work just south of the park in 1935 and 1936, no thorough scouting of this area was undertaken until 1937. Even the work within the park of that year can hardly be classed as a thorough job for attention had to be directed first toward about 200 miles of territory between the outposts of known infection in Idaho and the park boundaries. By the time that was completed, frost and early snow had caused such severe ribes defoliation that effective scouting was not possible, so work within the park was not as extensive as desired. However, the 1937 work did result in positive evidence of rust spread from known infection locations in Idaho to points within the 200 miles across Montana to the Wyoming boundary, the farthest being within 19 miles of the park boundary. All of these infections were on the highly susceptible and abundant _Ribes petiolare_ or wild black currant.

In the latter part of August and the first half of September, 1940 many of the better _R. petiolare_ scouting locations across the north half of the park and in the Absaroka National Forest north of the northwest corner of the park were scouted. In addition, a limited amount of work was done in the vicinity of Sylvan Pass on the east and in Teton National Forest and Teton National Park to the south. Although this work resulted in the careful inspection of several thousand ribes bushes and an estimated 1,000 associated _Pinus albicaulis_ and _P. flexilis_, no evidence of blister rust was found.

Another related area of particular interest, which was covered early in August, is the Bear Creek drainage on the Gallatin National Forest. It was there that the rust location 19 miles from the park was found in 1937. With an excellent association of _R. petiolare_ and _P. flexilis_ in this drainage it appeared most likely that the ribes infection of 1937 would cause pine infection that could be readily detected in 1940. Apparently the transmission of infection in 1937 did not take place for no cankers were observed during a careful inspection of the limber pines both within a short distance of the ribes infection location and throughout the lower half of the drainage.

Considering the rust invasion of this new territory on the basis of long distance spread from pines to ribes, differences in the weather conditions of 1937 and 1940 are undoubtedly responsible in a great measure for the differences in infection conditions. That is, the relatively moist spring and summer conditions in 1937 were favorable for rust spread and accounted for a general movement of the disease to distant locations while, conversely, the extremely dry summer of 1940 precluded this migration. However, it should be expected that the moisture conditions that favored spread from pine to ribes in 1937 likewise favored the short range spread

back to the pines that year. This would have resulted in small, incipient outbreaks of spore producing cankers in 1940 around which localized areas of ribes infection would occur. Since no such areas were found it appears that either there were few, if any, such centers started in 1937, or the cankers formed in 1937 did not mature in the three-year minimum period and therefore did not disseminate spores in 1940. This latter situation is a definite possibility but the most probable situation is a combination of the formation of only a very few small centers in 1937 and the delayed maturing of the cankers until 1941 and later. One thing which is reasonably certain from the scouting of 1937 and 1940 is that there is no extensive pine infection in Yellowstone National Park at present.

The lack of positive evidence of rust invasion by 1940 should not in any sense be interpreted as an indication that the rust threat to this region is any less serious for the eventual occurrence of that combination of factors that are favorable for extensive and serious rust development is a certainty. With the ideal setting for this event in the associations of the most highly susceptible native species of ribes and species of white pine in the West, it will be only a matter of time until this takes place. Because the exact time that such an invasion will take place cannot be accurately predicted, it is essential that a close watch be kept on the progress of the rust in the park region in order that control work can be so conducted as to give adequate and timely protection to the high value areas of white pine. Of greatest value, of course, would be the completion of control work for park areas in advance of general rust establishment, which is a much simpler task than that presented when the disease is present.

PRELIMINARY OBSERVATIONS IN MORRISON CAVE STATE PARK, MONTANA

By

Edward L. Joy, Forester

The Morrison Cave State Park, first established in 1908 as the Lewis and Clark Cavern National Monument, is a recently developed attraction about 45 miles northeast of Butte, Montana. Located about five miles from the Yellowstone Trail Highway it is approximately 14 miles from Whitehall.

With its fissure-like entrance about 1,300 feet above the river and about 500 feet below the rim of Cave Mountain, this phenomena is a series of passages and rooms extending to a depth of about 400 feet from which point a concrete lined tunnel leads out to the mountain slope. Due to the limestone formation of the mountains in this area, the cave is decorated profusely with stalactites and stalagmites, terraces, and carved forms many of which are in color. Extensive developments including stairways, lights and passageways in the cave, and a modern stone administration building nearby have made this an attractive stop for tourists.

Although much of the major ground cover of this region consists of sage and mountain mahogany, Juniperus scopulorum and Pinus flexilis occur scatteringly on most of the ground with the latter growing in fair stands in restricted areas. Within the park are several small areas of limber pine that will probably warrant protection from blister rust at some time in the near future. Chief among these is a small but fine stand of reproduction, averaging about 200 trees per acre, growing on a north facing slope adjacent to the administration building. This structure is located in a saddle some 1,000 feet in elevation above the main highway and about one-quarter mile from the cave entrance.

The ribes in association with the limber pine are Ribes cereum and R. setosum. Their occurrence is generally scattered although the latter grows in patches on rock slides and along the streams. Some of these are of large size which, along with their spiny stems, will make eradication difficult. In general, however, the control work necessary in the park is not great in quantity or difficult.

The nearest known locations of blister rust infection are two found in 1937 on R. petiolare, one about 40 miles southwest in the Wise River District of the Beaverhead National Forest and the other about 75 miles southeast on the Gallatin National Forest adjacent to Yellowstone National Park. Thus it appears likely that the disease is in the introductory stage in the region around Morrison Cave Park. Very limited scouting late in 1940 within this area did not reveal infection but more intensive coverage earlier in the season is necessary for accurate information on this point. However, the discovery of rust within 40 miles in 1937, coupled with the known extremely high susceptibility of limber pine, suggest the advisability of planning for the protection of the important areas of this species in the near future.

PRELIMINARY OBSERVATIONS IN CRATERS OF THE MOON NATIONAL MONUMENT, IDAHO

By
Edward L. Joy, Forester

Located in a semiarid section of south central Idaho just west of the Snake River desert, Craters of the Moon National Monument is a 49,000 acre reserve of relatively recent volcanic disturbance and lava deposits. Removed by 250 miles from the extensive stands of western white pine, this area is typical of many in this and other parts of the West in that it supports a growth of a secondary species of white pine. In this case the species is *Pinus flexilis* or limber pine. Of particular importance is the fact that although quite patchy and scattered it is the predominant conifer in this area with *Juniperus scopulorum*, *Pseudotsuga taxifolia* and *Pinus ponderosa* occurring only occasionally.

That the limber pine is of great importance as monotony-breaking cover on the lava and cinder formations is obvious. In this capacity its irregular occurrence at from one to 200 trees of all sizes per acre only adds to the interest of the area. The extremes of treeless cinder mounds with the appearance of huge piles of fine coal, groves of old and gnarled limber pines adjacent on the lower slopes, and the winding rivers of black, barren lava rock in the valleys are unique sights throughout the area.

Of the total of 49,000 acres it is estimated that about 20,000 acres support limber pine. This includes areas that have only a sparse growth of the species but which are intermingled with those supporting fairly complete limber pine cover. Many of the trees are somewhat stunted due to a great extent to heavy attack by mistletoe. In many instances this parasite has killed branches and in some cases entire trees, but stunting is its chief result.

The ribes situation in the area parallels that of the conifers in that one species predominates, and its occurrence is patchy or scattered. This is *Ribes cereum*, the dry site, small leaved, squaw currant. The bushes are not in any sense thrifty specimens, although some reach about two feet in height and the same in greatest width. Many smaller bushes are growing immediately under the large limber pines but all of these appear to be declining from suppression and drought. Occurrence is from a very few to about 250 per acre with the over-all population relatively light.

Although limber pine is highly susceptible to blister rust, the relatively low susceptibility of *R. cereum*, the general aridity of both the Monument area and adjacent lands, and the probability that no rust center is very close combine to suggest that control work for the unit is not urgent at this time. Undoubtedly a checkup every three or four years on the spread of rust toward this area with inspection of pines in the Monument will provide adequate information for the timely arrangement of control work.

PINE DISEASE SURVEY AND SCOUTING FOR WHITE PINE BLISTER RUST IN THE INLAND EMPIRE, 1940

By
R. L. MacLeod
Associate Pathologist

INTRODUCTION

As the pine disease survey during the past three years has resulted in sufficient data to determine the effectiveness of past control work and to establish priority of working over most of the white pine belt in the Inland Empire, the work in 1940 was confined for the most part to problem areas or to comparatively small reproduction and cutover areas where information on rust conditions was required. While some work was planned for pole-size trees, very little of this work was accomplished owing to the fact that so much time is consumed for the results received. Any such work would be designed to procure definite data on what is known from general observations and past disease survey work, that pole stands are less susceptible to damage than reproduction stands and are more easily protected. The major problems of control are now centered in reproduction and cutover areas; the pine disease survey was therefore concentrated on such areas.

Plot study work was continued under the leadership of C. R. Stillinger whose report follows this one.

A. Scouting for the Rust.

In the Inland Empire the known infected area remains the same as in 1939. With pine infection over all of the white pine belt, infection may be found on ribes each year in all parts of the area where these bushes occur in any quantity. Consequently, the rust is intensifying to some extent in those parts of the control area where the ribes have not all been removed and at a greatly increased rate in those unprotected drainages where the disease has been present for several years.

The year 1940 was not particularly favorable for the spread of the rust owing to dry weather during the period of aecial production, although the rust intensified to a considerable extent on ribes in the Inland Empire following moist periods in midsummer. Scouting on Glacier National Park failed to locate the rust on ribes or pine. Scouting on the Gallatin National Forest at a point 19 miles from Yellowstone National Park where ribes infection was found in 1937, revealed negative results on both ribes and limber pine. Additional scouting in and adjacent to both Yellowstone and Grand Teton National Parks also failed to reveal the presence of blister rust.

B. Pine Disease Survey

When disease survey work was initiated in October, 1935, too little was known of the extent of the rust. The work in 1936 was an extremely extensive sample of all the white pine type carried on with 33 men with

enlightening results on rust spread and intensification. During 1937 more intensive but still quite extensive work was carried on with 24 men to determine the extent of the disease and yield information on rust behaviorism under various conditions over all of the white pine belt. In 1938 and 1939 more intensive work was carried on with 16 to 20 men to increase the general knowledge of rust conditions in the major portion of the control area; to establish priority of necessary control work on various areas and to determine the effectiveness of the control work performed up to 1936 and 1937. This was a tremendous job resulting in more data than could be handled properly in order to study all the details of rust behavior. The justification for such widespread work was the need for rust information over all of the white pine type for efficient planning of the practical control work; less overall value would have resulted from more detailed work on one-half or two-thirds of the area or the placing of too much emphasis on points of rust behavior which were mainly of academic interest and not immediately applicable to control problems. As a result of this survey, priority of control work could be determined readily on all operations and available appropriations expended where the need was greatest; definite information had been secured on some of the fundamental aspects of rust behavior under various conditions and valuable data had been provided on the effectiveness of past control work. Concerning the latter point, the 1938 survey cast some doubt on the adequacy of control standards and the 1939 work resulted in making ribes eradication standards more strict. In 1939 results were secured on the wave of infection in 1937, a decidedly favorable year which resulted in a wide spread to new areas and severe intensification in areas where the rust was already present even where small numbers of ribes per acre were left.

As a result it was realized that standards of ribes eradication efficiency were not adequate up to 1938. Widespread studies on control work accomplished in 1939 and 1940 cannot be carried on until 1943 and 1944 at the earliest. In the meantime, disease surveys can be carried on in problem reproduction areas and in securing data on the rate of intensification in and disease tolerance of pole stands. This work will require less men; in 1940 the work was performed with four WPA employees and six men employed on regular Forest Service funds.

RESULTS

The amount of work accomplished in the Inland Empire is shown by operations in Table No. 1.

TABLE NO. 1

PINE DISEASE SURVEY, 1940
SUMMARY BY OPERATIONS

Operation	Miles of Strip	White Pine			Cankers	
		Number Examined	Infected			Per 100 Trees
			Number	Per Cent	Number	
Clearwater	126.2	62,757	10,288	16.4	31,971	51.0
Coeur d'Alene	19.7	1,523	215	14.1	837	55.1
St. Joe	83.6	26,435	3,981	15.1	13,104	49.6
Kaniksu	64.5	23,916	864	3.6	2,849	11.9
Mt. Spokane	19.6	11,406	78	.7	128	1.1
Total	313.6	126,037	15,426	12.2	48,889	38.8

More detailed data for each operation compiled by drainage and segregated by years when ribes eradication work was performed are shown in Tables Nos. 2 and 3.

TABLE NO. 2

PINE DISEASE SURVEY, 1940
SUMMARY BY DRAINAGE AND YEARS OF RIBES ERADICATION, CLEARWATER OPERATION

Drainage		White Pine			Cankers		Cumulative Per Cent by Years of Trees Infected					Number of Ribes Per Acre		
Years of Ribes Eradication	Miles of Strip	Number Examined	Infected Number	Infected Per Cent	Number	Per 100 Trees	Up to 1931	1932-1934	1935-1936	1937	1938	viscosissimum	lacustre	Total
Hall Creek Burn, T.40N R.7E Sec.18,19														
1933	1.1	2,210	464	21.0	853	38.6			.2	6.3	21.0	17.3	1.3	18.6
1933,1939	1.3	5,688	1,569	27.6	3,135	55.1		.2	.5	14.3	27.6	17.6		17.6
Unworked	.2													
Total	2.6	7,898	2,033	25.7	3,988	50.5		.1	.4	12.1	25.7	15.8	.6	16.4
Shoe Burn, T.40N R.6E Sec.26,27														
1933	.5	2,580	1,821	70.6	5,578	216.2	1.4	10.1	13.2	54.4	70.5*	314.7		314.7
Harlan Creek Ridge, T.40N R.6E Sec.27,28,34														
1933	.8	151	104	68.9	897	594.0		.7	6.6	66.9	68.9	15.2	.6	15.8
1934	.9	133	62	46.6	191	143.6		2.3	3.8	37.6	46.6	12.2	.6	12.8
Total	1.7	284	166	58.5	1,088	383.1		1.4	5.3	53.2	58.5	13.6	.6	14.2
Moose City, T.39N R.11E Sec.4,5,9														
Unworked	9.8	8,401	647	7.7	3,914	46.6		.4		4.3	7.7	1.1	63.4	64.5
Upper Beaver Plantation, T.39N R.5E Sec.11,14														
1934,1938	1.5	445	59	13.6	113	25.4		.7		8.7	13.6	7.6	7.3	15.0
1934,1938,1939	3.6	792	42	5.3	83	10.5			.1	2.5	5.3	1.7	1.7	3.4
1935,1938	.2	59	9	1.5	14	2.4				.5	1.5		2.0	2.0
Total	5.3	1,296	110	8.5	210	16.2		.2	.3	4.8	8.5	3.3	3.3	6.6
Bungalow Area, T.38N R.7E Sec.13,19,24														
Unworked	1.7	742	274	36.9	2,367	319.0		3.8	5.5	29.5	36.9	47.3		47.3
North Fork Reeds Creek, T.38N R5E Sec.11,14,15,22														
1932	3.0	3,414	498	14.6	921	27.0		.05	.1	7.9	14.6	36.7	13.5	50.2
1933	5.1	3,043	559	18.4	1,197	49.3				7.8	18.4	32.9	17.6	50.6
1933,1936	15.5	9,681	772	8.0	1,648	17.0		.02	.2	3.9	8.0	17.7	5.7	23.4
1933,1937	1.3	136	1	.7	1	.7				.7		33.1		33.1
Total	24.9	16,274	1,830	11.2	3,767	23.1		.02	.1	5.4	11.2	23.9	8.8	32.7
Lower Reeds Creek, T.38N R.4E Sec.14,15,22,23														
1936	5.8	2,369	844	35.6	4,305	181.7	.1	5.6	11.8	30.9	35.6	39.2	2.1	41.9
1937	1.2	486	202	41.6	944	194.2		3.9	9.9	36.0	41.6	102.8		102.8
Total	7.1	2,855	1,046	36.3	5,249	181.9	.1	5.2	11.4	31.4	36.3	50.2	1.8	52.6
Poorman Creek, T.37N R.4-5E Sec.13,18														
1934	3.0	2,566	324	12.6	1,048	40.8	.04	1.4	1.6	9.5	12.6	16.5	2.5	19.0
1934,1939	.7	286	55	19.2	69	24.1				17.5	19.2	.8		.8
Total	3.7	2,852	379	13.3	1,117	39.2	.04	1.3	1.5	10.3	13.3	13.7	2.0	15.7
Musselshell Creek, T.36N R.6E Sec.20,21,22,23,26,27,28,29,33,34														
1932	1.8	1,631	117	7.2	205	12.6	.6	.6		3.3	7.2	26.6	2.5	29.1
1934	9.1	2,649	567	21.4	1,658	62.6	.2	5.2	5.4	13.9	21.4	19.1	1.3	20.3
1935	10.1	2,317	218	9.4	455	19.6	.04	1.8	1.9	5.7	9.4	16.3	3.4	19.7
1936	.9	145	5	3.4	6	4.1			.7		3.4	13.4		13.4
1937	1.1	293	10	3.4	12	4.1				1.7	3.4	40.9	41.8	82.7
Total	23.0	7,035	917	13.0	2,336	33.2	.1	2.7	2.8	7.9	13.0	19.3	4.2	23.5
Pierce Area, T.36N R.5E Sec.2,11														
1933,1937	3.6	930	151	16.2	382	41.1		.4	1.3	14.5	16.2	10.8	.1	10.9
Grasshopper Creek, T.36N R.5E Sec.17,20,21														
1935	9.3	3,155	303	9.6	592	18.8		.4	.6	6.5	9.6	2.4	.2	2.6
1935,1938	2.2	556	92	16.5	182	32.7		.5	.9	14.9	16.5	1.1	.2	1.3
Total	11.5	3,711	395	10.6	774	20.9		.4	.6	7.8	10.6	2.1	.2	2.3
Lolo Creek, T.35-36N R.6E Sec.2,3,4,10,11,14,15,16,17,20,35														
1932	4.0	1,657	166	10.0	363	21.9		.7	1.2	7.8	10.0	58.5	1.1	59.6
1932,1935	.2	33										2.0		2.0
1932,1937	1.6	1,814	27	1.5	30	1.6		.2		1.2	1.5	.9		.9
1933	4.2	625	75	12.0	228	36.5	.2	1.8	2.1	8.8	12.0	4.5	.8	5.3
1933,1937	1.3	109										4.9		4.9
1934	4.8	951	25	2.6	112	11.8		.3		2.2	2.6	2.9	.8	3.7
Total	16.1	5,189	293	5.6	733	14.1	.02	.6	.8	4.4	5.6	17.1	.7	17.8
Eldorado Creek, T.34N R.6E Sec.23,24,25,26,27,28,33,34,35														
1932	9.7	1,206	146	12.1	315	26.1		.2	.3	8.0	12.1	68.7	10.1	78.8
1935	3.4	1,219	37	3.0	70	5.7		.2		2.4	3.0	8.1	1.0	9.1
1936	1.7	285	43	15.1	83	29.1		.3		5.6	15.1	351.2	33.9	385.1
Total	14.7	2,710	226	8.3	468	17.3		.2	.3	5.2	8.3	87.2	10.7	97.9
Grand Total	126.2	62,757	10,288	16.4	31,971	50.9	.1	1.2	1.8	10.5	16.4	26.9	9.1	36.0

*Percentage for 1938 does not check with percentage for drainage due to the fact that the negligible amount of infection of 1939 origin is not included in the table.

TABLE NO. 3

PINE DISEASE SURVEY, 1940
SUMMARY BY DRAINAGE AND YEARS OF RIBES ERADICATION
ST. JOE, COEUR D'ALENE, KANIKSU AND MOUNT SPOKANE OPERATIONS

Drainage		White Pine			Cankers		Cumulative Per Cent by Years of Trees Infected					Number of Ribes Per Acre		
Years of Ribes Eradication	Miles of Strip	Number Examined	Infected Number	Infected Per Cent	Number	Per 100 Trees	Up to 1931	1932-1934	1935-1936	1937	1938	viscosissimum	lacustre	Total
St. Joe Operation														
Mica Creek, T.44N R.2E Sec.5,8,9,16,17														
1936	4.7	2,555	716	28.0	2,781	108.8	.2	3.1	4.9	22.2	28.0	.5	1.7	2.2
1936,1939	.6	307	139	45.3	308	100.3		11.7	19.5	40.4	45.3		1.8	1.8
1939	3.6	2,141	864	40.4	3,872	180.9	2.1	4.7	5.6	23.4	40.4	3.9	1.7	5.5
Total	8.9	5,003	1,719	34.4	6,961	139.1	1.0	4.3	6.1	23.8	34.4	1.9	1.7	3.6
St. Maries River, T.43N R.2E Sec.31,35,36, T.42N R.2E Sec.7														
1934	4.3	2,876	189	6.6	351	12.2	.07	2.2	2.5	6.4	6.6		.2	.2
1934,1938	.8	149	28	18.8	46	30.9	2.7	13.4		18.1	18.8			
Total	5.1	3,025	217	7.2	397	13.1	.2	2.7	3.1	7.1	7.2		.2	.2
Elk Creek, T.41N R.2E Sec.13,14,15,22,23,24,25,26,27, T.41N R.3E Sec.18,19,30														
1934	3.8	643	110	17.1	320	49.8		.3		6.7	17.1	3.8	40.0	43.8
1935	11.7	2,294	292	12.7	502	21.9		.2		2.2	12.7	146.0	39.0	185.0
1936	2.5	750	162	21.6	334	44.5		.1		10.7	21.6	65.0	18.0	84.0
1934,1938	.5	101										33.0	2.0	35.0
1936,1938	2.0	586	32	5.5	37	6.3				2.7	5.5	2.0	5.5	7.5
Unworked	7.5	901	330	36.6	1,951	216.5		1.8		21.5	36.6	57.0	34.0	92.0
Total	28.0	5,275	926	17.6	3,144	59.6		.4		7.3	17.6	83.0	33.0	116.0
Moose Creek, T.41N R.1W Sec.23,25,26,27,35,36														
1934	8.6	835	10	1.2	12	1.4		.1		.2	1.2	.1		.1
East Emerald Creek, T.42N R.1E-1W Sec.7,12,13,18														
1935	1.7	263	8	3.0	13	4.9		.8	3.0			18.3	1.7	20.0
1936	4.6	1,711	212	12.4	677	39.6	.6	4.8	5.6	11.6	12.4	14.6	2.9	17.5
1937	4.1	1,875	174	9.3	315	16.8	.3	3.1	3.7	9.0	9.3	2.1	2.0	4.1
1936,1937	.8	14										.6		.6
1936,1939	1.2	882	76	8.6	228	25.9	1.2	5.0		8.5	8.6	2.5	.4	2.9
Unworked	.1	4	2	50.0	3	75.0			50.0			76.0		76.0
Total	12.5	4,749	472	9.9	1,236	26.0	.5	3.9	4.6	9.5	9.9	9.6	2.0	11.6
Cedar Creek, T.39N R.2E Sec.35														
1936	2.0	812	325	40.0	799	98.4	3.2	15.0	22.2	32.0	40.0	10.5	.3	10.8
Long Meadow Creek, T.39N R.2E Sec.1,2,3,10,11,12														
1935	12.7	4,310	108	2.5	149	3.5				1.2	2.5	2.8	2.3	5.2
1936	5.8	2,426	204	8.4	406	16.7		.5	.5	3.9	8.4	4.6	9.4	14.0
Total	18.5	6,736	312	4.6	555	8.2		.2	.2	2.2	4.6	3.4	4.5	7.9
Grand Total	83.6	26,435	3,981	15.1	13,104	49.6	.4	2.4	3.1	10.0	15.1	30.0	12.0	43.0
Coeur d'Alene Operation														
Fortier Creek, T.49N R.2W Sec.26,27,28,29,33,34,35,36														
Unworked	19.7	1,523	215	14.1	837	55.1	.1	1.8	2.8	11.9	14.1	18.1	6.1	24.2
Kaniksu Operation														
Packer and Zero Creeks, T.62N R.5W Sec.8,17,18,19,21,28														
1936	14.6	3,073	40	1.3	50	1.6				.5	1.3	.5	.5	1.0
1938	.2	8												
Total	14.8	3,081	40	1.3	50	1.6				.5	1.3	.5	.5	1.0
Beaver Creek, T.62N R.4-5W Sec.1,6,7,8,12,13,17,18														
1934	3.4	1,094	9	.8	9	.8				.8		1.8	2.5	4.3
1936	6.1	5,839	62	1.1	68	1.2				1.0	1.1	6.2	1.9	8.1
Unworked	3.5	1,766	20	1.1	25	1.4				1.0	1.1	141.0	3.1	144.1
Total	13.0	8,699	91	1.0	102	1.2				.9	1.0	41.0	2.4	43.0
Pack River, T.59N R.2W Sec.4,5,6,7,8,9, T.60N R.2W Sec.7,8,9,10,16,17,18,19,29,30,31,32,33														
1935	12.4	4,138	93	2.2	175	4.2		.1	.2	1.2	2.2	.6	2.6	3.2
Unworked	21.4	7,582	597	7.9	2,345	30.9		.03	.3	3.5	7.9	13.0	20.0	34.0
Total	33.8	11,720	690	5.9	2,520	21.5		.05	.2	2.8	5.9	8.8	14.0	23.0
Sullivan Creek, T.39N R.45E Sec.9,10,19.20														
1936	1.1	146	4	2.7	5	3.4				.7	2.7			
1939	1.9	270	39	14.4	172	63.7		.4		4.1	14.4	.3	.5	.8
Total	3.0	416	43	10.3	177	42.5		.2		2.9	10.3	.2	.3	.5
Grand Total	64.5	23,916	864	3.6	2,849	11.9		.03	.1	1.8	3.6	13.0	8.1	21.0
Mount Spokane Operation														
Spirit, Deadman and Thompson Creeks, T.28N R.45E Sec.22,23,24,25,26,27,34,35														
1935	1.0	429										4.0	44.0	48.0
1935,1936	2.7	1,715	13	1.1	13	1.1		.1		.4	1.1	5.3	4.1	9.4
1935,1937	2.8	2,999	12	.4	16	.5		.1		.4		11.1	21.1	32.2
1935,1936,1938	.5	13											11.0	11.0
1935,1936,1939	.7	825										8.0		8.0
1935,1937,1939	3.1	683	15	2.2	55	8.1		.6		2.0	2.2	4.1	3.4	7.5
1936	2.1	372										2.0	9.2	11.2
1936,1938	1.5	1,177	8	.7	8	.7				.5	.7	35.3	2.0	37.3
1936,1939	1.1	1,189	7	.6	7	.6				.6		3.4	4.2	7.6
1938	2.5	487	7	1.4	10	2.1				.2	1.4	5.2	5.2	10.4
Unworked	1.7	1,517	16	1.1	19	1.3				.7	1.1	6.0	6.0	12.0
Grand Total	19.6	11,406	78	.7	128	1.1		.1		.5	.7	8.0	9.1	17.1

DISCUSSION

The most striking result of the 1940 survey is the fact that the rust increased during 1937 or 1938 in all reproduction areas surveyed on all operations regardless of when control work was performed. From this arresting result the most important conclusion to be drawn is that a new conception of rust potentiality must be recognized by all control personnel if successful protection is to crown their efforts in the younger stands of pine. As a result of this new rust potentiality, more serious consideration must be given to the number of ribes which may be left for a period of years in any area and to the practicability of securing protection in certain reproduction or cutover areas.

The rust became established in the white pine belt of the Inland Empire in 1923, a favorable year. These cankers were producing aecia by 1927, the next favorable year, when a second wave greatly extended the number of spot infections. While there was some new infection originating during the intervening years, the next wave year occurred in 1932 in parts of the white pine belt, in others in 1933. While there was a considerable extension of pine infection in 1935 and 1936 owing to the fact that the 1932 and 1933 infection had started to produce aeciospores, the next wave of infection occurred in the favorable year 1937. This wave resulted in such heavy intensification in infected areas and such wide spread to new areas that the situation is now dangerous on all operations. While in the past the wave years have been dangerous and the intervening years much less so, after 1940 each year will represent a much greater potentiality of danger than prior to that time. This has been indicated in the fact that a considerable amount of infection occurred in 1935 and 1936, less favorable years, when infection of 1932 and 1933 origin started to produce aecia. It is indicated by the amount of infection of 1938 origin shown in Table No. 2. Here, in general, the areas which do not show much infection of 1938 origin were surveyed prior to July when infection of 1938 origin started to appear in quantity. In some cases more infection originated in 1938 than in 1937. Although weather conditions were less favorable in 1938, the infection of 1935 origin had started to produce aecia which, coupled with the production of aecia from the 1933 wave, resulted in a dangerous condition. Some of the cankers of 1937 origin started to produce aecia in 1940, more will fruit in 1941; some cankers of 1938 origin will also fruit in 1941. This will result in a new rust potentiality whether 1941 is a favorable year or not. While it is necessary to protect against the worst possibility, the wave years, a new conception of danger in the intervening years from any number of ribes must result from considering the effects of the heavy intensification in 1937 and 1938.

During the period from 1933 when spot infections became widespread to 1939 when the results of the 1937 wave were evident, many areas with 25 or 50 or even 100 ribes per acre showed no introduction of the rust. This resulted in a false sense of security, a belief that the arbitrary standards of efficiency were sufficiently strict. The results of the 1939 survey showed that this was not true, consequently the standards were made more strict. The 1940 surveys confirmed the indication that small numbers of

ribes were not safe when the rust was present in any reproduction area. While the rust increased tremendously where 15 or 20 or more ribes were present in an area of light rust, a dangerous increase occurred where ribes averaged more than five per acre; in areas of heavy rust, with 20 to 30 per cent of the pine infected, an increase occurred with less than five ribes per acre. This is particularly true on the St. Joe and Clearwater operations, but it is disconcerting to note that the rust is now evident on parts of the Coeur d'Alene and Kaniksu where no rust was found previously and where the smaller numbers of ribes had been considered comparatively safe for a period of years.

It is now evident that in areas of reproduction showing more than 10 or 15 per cent infection the ribes must be reduced to practically zero. It is also quite evident that this will be extremely expensive on some areas with difficult working conditions. More costly work and more workings on such areas must be recognized as necessary to carry the 0-10 year age class to pole size or maturity. It is becoming increasingly evident that with present appropriations ultimate success on all reproduction areas now included in the control area is doubtful. From these facts it may be seen that the question of values becomes paramount. It is, therefore, recommended that control work be confined to the higher value areas and that the younger reproduction stands with poor stocking, some areas with more than 15-20 per cent of the pine infected or with heavy working conditions which preclude the possibility of reducing the ribes to one or two per acre, be eliminated from further consideration as control area.

BLISTER RUST PLOT STUDIES

By
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The intensive study of white pine blister rust as a supplement to the general survey for the disease by means of specific plots was continued during the 1940 field season. Due to the volume of work necessary on the plots which had been previously established, no new plots were started. The entire summer season was employed in improvement work and making inspections of ribes, recording the amount of disease present and inspecting pine on those plots where data could be obtained which would have a direct bearing on some of the eradication problems. The pertinent results obtained from a particular plot are given in this report. All plots discussed in detail are in the Clearwater operation.

POWDER HOUSE PLOT

This plot of 95 acres is located in the SE. $\frac{1}{4}$ sec. 27, T. 37 N., R. 5 E. about four miles north of Pierce, Idaho. The timber was clear cut in 1928. At present the area is well stocked with white pine about ten years old, varying from quite open to dense growth and averaging about 1,200 trees per acre. The ribes were eradicated in 1933, averaging about 250 bushes per acre.

Since the disease was established upon the pine on this plot during or before 1933, and since it was evident that a considerable amount of infection had developed from the 1937 wave of infection and further, since the ribes had been reduced to approximately 1.74 bushes per acre by the eradication work in 1933, the trees on this area appeared to present an opportunity to obtain definite information regarding the infecting power of individual bushes as well as clumps of _Ribes lacustre_, _R. viscosissimum_ and _R. petiolare_ under a variety of ecological conditions. Therefore, the decision was made to inspect around each bush or clump in order to determine the amount of infection which was present. As this inspection progressed it became apparent that, although there was some concentration of infection around the bushes, there was scattered infection over the entire plot. For this reason all the pine on the approximate 95 acres were inspected. Also, in order to study the relation of the infection, not only to the ribes but to the topography, a contour map with ten-foot intervals was prepared. These data are being compiled preparatory to their analysis but because of the volume of the data the work has progressed only far enough to give a partial report at this time.

All ribes on the plot were inspected for blister rust and the amount of disease present was recorded. During this inspection some new ribes were found. Also, the ribes population was reduced from 165 to 69 or approximately 42 per cent of the original (Table 1). All concentrations were eliminated and the ribes which were left were spaced so that a ribes-free zone of approximately three chains on all sides was left around each bush. On a per acre basis the ribes were reduced from 1.74 bushes with

31 feet of live stem to 0.73 bushes with 15 feet of live stem. Table 1 gives a summary of ribes population and the amount of disease found on the ribes in 1940 compared with that in 1939. In order that the data might be more comparable, the bushes which were found for the first time in 1940 have been tabulated separately.

TABLE 1

SUMMARY OF RIBES DATA - POWDER HOUSE PLOT, 1939-1940

Year Insp.	No. Bu.	F.L.S.	No. Lvs.	Lvs. Per FLS	Total Disease Sq.In.	Total Inf. Lvs.	Per Cent Lvs. Inf.	Ave.Inf. in Sq. In. Per Inf.Leaf	Ave.Inf. in Sq. In. Per F.L.S.	Not Erad. 1940 No. Bu.	Not Erad. 1940 F.L.S.
Ribes lacustre											
1939	35	869.9	21,561	24.8	18.88	372	1.73	.0508	.0217		
1940	34*	1,041.3	13,880	13.3	38.98	718	5.17	.0543	.0374	15	233.4
New	3	6.8	102	15.0	.04	1					
Ribes viscosissimum											
1939	80	1,335.8	15,520	11.6	433.30	2,670	17.20	.1623	.3244		
1940	78**	1,521.8	12,370	8.1	389.49	2,221	17.95	.1753	.2559	51	1,214.5
New	15	221.2	2,318	10.5	42.02	530					
Ribes petiolare											
1939	31	172.7	982	5.7	227.15	711	72.40	.3195	1.315		
1940	30*	148.0	915	6.2	229.64	796	86.99	.2885	1.552	3	9.1
New	1	4.5	22	4.9	25.45	22					

*One bush dead in 1940.
**Two bushes eradicated in 1939.

In general, about the same amount of square inches of disease for the same bushes was present on the R. viscosissimum and R. petiolare in 1940 as was found in 1939, but twice as much was found on R. lacustre in 1940. This same difference is evident when the per cent of leaves infected is compared. The difference in susceptibility between the different species is suggested by a comparison of the average infection per infected leaf and the average infection per foot of live stem for the three species.

The difficulty to find all the ribes on an area is illustrated by the new ribes found in 1940. During 1939 the area was inspected carefully by selected eradication men in order to find every bush, if possible. However, in 1940, 19 additional bushes were found, or an increase of 13 per cent. These new bushes were nearly all large enough to be seen readily, were all in separate locations and out in the open so that the eradication men should have found them.

The progress of the disease since eradication presents a serious situation. It was probably first established in one spot in 1929, but since the eradication was done late in 1933, a favorable year for infection, 0.4 per cent of the pine were infected that year. This infection was distributed

W 2682. General view of Hollywood Plot looking southwest.

generally over the area. The serious situation is that, although the ribes were reduced from approximately 250 per acre to 1.74 per acre, yet as a result of one wave the per cent of infection jumped to an average of 5.7, a rate of increase indicating that in 12 to 15 years this stand may be seriously damaged by this small number of ribes. Indeed, in some cases around individual bushes or groups of bushes the percentage of infection is much higher. In other cases where the ribes bushes were exposed to the winds and were not screened on all sides by trees, the result was a wide scattered distribution of the disease for several chains. Detailed data on these points cannot be presented because the information has not been analyzed.

The probable wide distribution and the lack of concentration of the disease near the bush in the case of ribes in open spaces, especially those on hilltops, reveals this type of situation as more important than has been expected. However this uniform wide distribution may not always represent serious damaging power if every ribes is removed from the surrounding stands. But since it is proving very difficult to eradicate the last few ribes in a stand, and the presence of a fruiting canker within a few feet of a bush makes any ribes a serious menace, it may be advisable to eradicate the ribes from some open ridges in our white pine stands for a considerable distance from the pine.

HOLLYWOOD PLOT 9

This plot of 6.4 acres is located in sec. 17, T. 37 N., R. 5 E. The timber was cut selectively in 1934, leaving a considerable number of pine for seed trees and a possible second cutting. (See Photo W 2682) The area is well stocked with young white pine about six years old. Because no eradication of the ribes had been carried out, the situation represents the natural conditions following logging in a region where blister rust was established in the older timber previous to logging. Thus, the area offered an opportunity to study the effect of white pine blister rust upon a young developing stand from which the ribes had not been eradicated. A plot 8 chains square or 6.4 acres was established. In 1939 the entire plot was searched for ribes. Those found on the two outside chains were eradicated, providing a protection zone of two chains around the center four chain square. During the season of 1940 the pine on the entire 6.4 acres were inspected for blister rust infection. Also a search was made for any ribes which were missed in 1939. Since the pine were small all of those infected as well as all ribes on the plot were numbered and staked. The tops of the pine stakes were painted red and those for the ribes, white. A blue band was painted around each stake representing an infected pine if the pine were already dead from blister rust, and around each stake representing a ribes if the bush had been eradicated. This procedure provided a method for keeping a record of the developments which take place on the plot, presented a visual picture of what infection had already developed on the pine and demonstrated in a striking manner the relationship between the occurrence of ribes and infection on the pine. This setup proved especially valuable for demonstrating the effects of blister rust to those who were not familiar with the problem.

Except for one small upland R. petiolare all the ribes on the plot were found to be R. viscosissimum. This population has all developed since the timber was cut. For the entire plot an average of 47 ribes per acre was found. The 1.6 acres in the central part of the plot averaged 70 R. viscosissimum per acre. This year, after a study of the distribution of the ribes, the population for the entire plot was reduced to 11 ribes per acre. The ribes which were left are located in such relative positions that the influence of each bush will be indicated by any future infection which may develop.

The inspection of the white pine for blister rust revealed an interesting situation. The reproduction averaged 4,335 trees per acre varying from 600 to 10,000 trees. Only 2.93 per cent of the trees were found to be infected, the rate of increase indicating that without removal of any of the ribes the trees will all be infected in ten to fifteen years. Probably all of those already infected will be killed. With the exception of the chain square in the northwestern corner all of the infection occurred in 1937 or later. About one-half of this chain had a dense growth of white pine twenty-five to fifty years old, and in this group 39 per cent of the trees were infected. Nine per cent of these trees were infected during the period 1932 to 1933.

TRAIL CREEK PLOT 6

This plot of 6.4 acres is located in the NE. $\frac{1}{4}$ sec. 10, T. 37 N., R. 5 E. about seven miles north of Pierce, Idaho. The timber on the general area was clear cut in 1928. The site is now well stocked with almost a pure stand of white pine eight to ten years old, averaging 1,783 white pine per acre. In 1933 approximately 325 ribes per acre, in the proportion of about one R. lacustre to two R. viscosissimum, were removed.

In 1938 a plot of 1.6 acres, four chains square, was laid out. In 1939 a two chain wide protection zone was established around this plot and all ribes which were found were eradicated. An inspection of the main plot revealed that the ribes present were entirely R. lacustre. During the 1940 season the locations of all of these ribes were marked with white stakes and each was given a number. Picture W 12 gives a good idea of the ribes and white pine distribution on the plot.

Since the ribes population consisted entirely of R. lacustre, many of which were small yet old bushes, due to grazing, and this condition had existed since 1933, this plot presented an opportunity to secure definite information on the amount of rust which the various sized bushes might carry as well as data on the pine infection which had developed from such a population of R. lacustre. Therefore, all the ribes on the plot were carefully inspected, all the pine on a strip one chain wide and four chains long were inspected and all trees and cankers which were found on this strip were numbered.

W 12 General view of the west of Trail Creek Plot 6. White stakes are locations of individual Ribes lacustre bushes

TABLE 2

SUMMARY OF SIZE, FEET OF LIVE STEM AND INFECTION ON RIBES LACUSTRE
TRAIL CREEK PLOT 6

	Height Classes by Inches												
	0-6	7-12	13-18	19-24	25-36	37-48	49-60	61-72	73-84	85-96	97-108	109-Over	Totals
No. Bushes	241	165	78	18	5								507
Percent Bushes	47.5	32.5	15.4	3.6	1.0								100
No. Inf.	58	63	34	7	4								166
% of Tot. Inf.	34.9	38.0	20.5	4.2	2.4								100
% of Class	24.1	38.2	43.5	38.9	80.0								
% Tot. Bu.	11.4	12.4	6.7	1.4	.8								
Class by Inches Live Stem													
No. Bushes	178	107	61	34	48	28	13	10	9	5	2	12	507
Percent Bushes	35.1	21.1	12.0	6.7	9.5	5.5	2.6	2.0	1.8	1.0	.4	2.3	100
Total In. L.S.	657	970	940	736	1,476	1,051	702	664	695	453	196	1,966	10,506
Percent Total	6.3	9.2	9.0	7.0	14.0	10.0	6.7	6.3	6.6	4.3	1.9	18.7	
Tot. Lvs.	1,407	1,767	1,570	1,093	2,459	1,674	871	1,042	1,076	822	447	3,249	17,477
Percent Total	8.1	10.1	9.0	6.3	14.1	9.6	5.0	6.0	6.2	4.6	2.5	18.5	100
Lvs. per Ft.L.S.	25.7	21.9	20.0	17.8	20.0	19.1	14.9	18.8	18.5	21.7	27.4	19.8	20.0
Tot. Lvs. Inf.	117	72	183	127	197	103	85	55	55	7	42	15	1,058
% of Inf. Lvs.	11.1	6.8	17.3	12.0	18.6	9.7	8.0	5.2	5.2	.7	4.0	1.4	
% Lvs. in Class	8.3	4.1	11.7	11.6	8.0	6.1	9.8	5.3	5.1	.8	9.6	.5	6.1
Tot. Sq. In.Inf.	11.32	6.86	9.18	8.18	11.90	6.52	11.16	1.64	1.38	.43	2.30	.43	71.30
% Tot. Inf.	15.9	9.6	12.9	11.5	16.7	9.1	15.7	2.3	1.9	.6	3.2	.6	100

Table 2 is a summary of the data resulting from the inspection of all the R. lacustre on the plot. This table gives a classification of all the bushes by height classes as well as a classification of the bushes by feet of live stem and disease data for each classification. In examining the data two facts should be borne in mind; that the data are for 1.6 acres, and that the small bushes are dwarfed and stunted due to suppression and grazing instead of age. The data with reference to these small bushes on the plot are especially interesting. For example, by height classes, 47.5 per cent of the bushes are six inches or less in height, and 35 per cent of the infected bushes are in this class. By live stem classes, 35 per cent of the bushes have six inches or less of live stem, have only 6.3 per cent of the total live stem of all ribes and 8.1 per cent of the leaves, yet have 15.9 per cent of the total disease on all the ribes. If the first two classifications by feet of live stem are grouped, then the data show that 56.2 per cent of the bushes have one foot or less of live stem but have only 15.5 per cent of the total feet of live stem, only 18.2 per cent of the total leaves, yet have 25.5 per cent of the total infection. The data indicate that the small bushes must be found and eradicated if protection of the white pine from blister rust is to be obtained.

This point, as well as the general infecting power of R. lacustre alone, is emphasized by the data for the infection on white pine which has developed since the eradication work in 1933. On a per acre basis the plot has an average of 1,783 white pine and 317 ribes with 547 feet of live stem. At the time of eradication, three per cent of the pine were infected. In 1940, 44 per cent of the pine were found to be infected. Nearly all of the increase was due to the 1937 wave of infection.

These data reveal the following points: that serious blister rust damage to white pine may be caused by the presence of R. lacustre; that small, stunted bushes of R. lacustre may develop a high percentage of blister rust when compared with larger bushes; and that ribes re-eradication must be timed according to the stage of the development of the rust on a particular area. With reference to the last point, the ribes on this area should have been eradicated again during or before 1937 and again, if necessary, by 1941 at the latest instead of in 1940 if infection were to be greatly retarded in its spread and intensification.

INFLUENCE OF VARIOUS FACTORS UPON PER CENT OF INFECTION OF BLISTER RUST

It has become apparent from the data which have accumulated from the plot studies that the percentage of infection which develops in a stand of white pine is resultant of several factors. Each of these factors not only produces an individual effect upon the percentage of infection, but due to their interaction upon each other, produce an accumulative effect.

In order to obtain some suggestions regarding this problem the data for several of the plots have been statistically analyzed. As a result of this analysis the following factors have been found to have the most important influence on the per cent of trees infected: number of ribes, feet

of live stem, number of trees and slope of the topography. Their relative importance has not been determined.

Several tests of the data by approximation indicated that the relationship between these factors was linear or so nearly linear that analysis of the data by multiple linear regression would give some information regarding the influence and importance of the factors indicated above upon the percentage of infection. Table 3 gives a summary of the results obtained thus far by such an analysis. All data have been reduced to a per acre basis. The number of ribes per acre by species and the number of white pine per acre are given as an indication of the conditions on each plot. While the data for two of the plots showed a significant relationship; that is, that there was only one chance in twenty that the results occurred by chance, in six of the plots the correlation was very significant; that is, in 99 cases out of 100 the relationship indicated for the particular plot was representative for that set of conditions. In the last column is given the per cent of the rust (coefficient of determination) on the plot which is accounted for by the analysis.

The values obtained in the column for the effect of slope suggest a very definite influence on the percentage of infection, that is, a decrease in the percentage of infection, other factors being equal, for each chain up a slope on which the infection occurs. Likewise, every variation in the number of ribes feet of live stem or number of trees per acre influences the amount of infection as these factors increase or decrease in size. There is a considerable variation in the effect of each factor on the different plots, probably due to the difference in time the rust has been present, the various sizes of the samples which were taken as well as the various amounts of ribes and pine present on the plot area. Until a greater amount of data can be assembled, no definite conclusions can be drawn. Therefore, this data must be considered as only indicative of the fact that all of these factors may have a definite influence upon the percentage of infection which may develop. Further work of this nature might suggest more definitely the relative importance of each factor and thus make it possible to draw some conclusions.

TABLE 3

RELATIVE INFLUENCE OF SLOPE, NUMBER OF RIBES, FEET OF LIVE STEM AND NUMBER OF TREES PER ACRE ON THE PER CENT OF INFECTION

Plot	Ribes Per Acre		No. Trees Per Acre	Regression Equation					Standard Error of Estimate	Mult. Corr.	Signif-icance	Per cent Rust Accounted For
				Infec-tion a.	Increase in % Infection							
	Lac.	Vis.			Per Chain Up Slope	Per Each Ribes Per Acre	Per 10 F.L.S. Per Acre	Per 100 Trees Per Acre				
Newman Lake	22		60	75.81	Level	1.0342	.2680	53.24	14.14	.8751	S	76.6
Snake Creek	46	26	1,303	36.97	Level	.4416	.2178	.1980	16.80	.5740	VS	32.9
Bird Creek	291	158	6,419	47.90	-1.7457	.0644	.0084	.2390	11.68	.8780	VS	77.1
Crystal Creek I	5	199	429	93.92	-5.3543	.0461	.0009	6.6320	10.47	.9567	VS	91.5
Crystal Creek II	7	906	967	61.18	-1.3913	.1872	.0481	8.8560	21.12	.7501	VS	56.3
British Columbia	13		227	68.86	-2.3171	.0860	.0880	.2000	3.57	.9654	VS	93.2
Long Meadow	46	182	2,148	89.64	-4.6176	.9299	1.2035	1.5850	6.43	.9768	VS	95.4
Trail Creek	352		1,783	23.75	-1.8152	.0227	.1608	.8600	11.27	.7675	S	57.4

SUMMARY

The data in this report are a preliminary basis for the following suggestions:

1. About the same amount of disease was present on the ribes in 1940 as in 1939.

2. The great difference in susceptibility of R. lacustre, R. viscosissimum and R. petiolare is very evident.

3. The Powder House plot reveals the difficulty in locating the last few bushes on an area.

4. In open reproduction type the reduction of the ribes to an average of 1.7 bushes per acre may not give control of blister rust if the disease has already become established.

5. When blister rust has become established in an area R. lacustre, although a species of low susceptibility, is capable of developing enough rust to cause serious damage to white pine.

6. Ribes lacustre dwarf bushes may develop more rust in proportion to their live stem than larger bushes and appear to represent a real menace to white pine, therefore must be thoroughly eradicated.

7. The slope of the topography, number of ribes, feet of live stem and number of trees per acre all appear to have a definite influence upon the per cent of infection which may develop in a given time.

Preliminary reports have been issued to date on the following plot studies:

1. Report on Bird Creek Blister Rust Plot
2. Long Meadow Creek Plot
3. Report on Deep Creek Blister Rust Study Plot
4. Three Bear Creek Blister Rust Plot
5. Report of Data obtained on Crystal Creek Plot II
6. Report on Crystal Creek Plot I
7. Middle Fork St. Maries River
8. Report on Blister Rust Investigation on Snake Creek Plot.

DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION AND PROGRESS OF RIBES ECOLOGY WORK IN THE NORTHWESTERN REGION FOR 1940

By
V. D. Moss, Assistant Pathologist
C. M. Chapman, Chief Scientific Aid

INTRODUCTION

The activities of the methods project in the Northwestern Region for the calendar year 1940 included further statistical work with the 1939 tagging data, checking of chemical and ecological studies, establishment of ecological plots, laboratory and greenhouse work at Berkeley, and the designing and testing of new eradication tools.

The developmental work in methods of ribes eradication consisted in making additional statistical studies of the 1939 tagging data. The conclusions, based on the analytical determinations, are presented in this report. The final report in body will appear at a later date as Serial No. 108. The results of 1938 rework of *Ribes montigenum* by hand, oil, and Atlacide in Colorado are shown, and comments are made on the 1937 chemical plot work in the states of Colorado and Wyoming. Some general comments on ribes regeneration in Colorado and Wyoming are also included. All of these data are presented in part I under the heading "Developmental work in methods of ribes eradication."

During 1940 no additional studies on the chemical eradication of ribes were undertaken in the Northwestern Region. Field inspections of stream type chemical mop-up work and the treatment of decapitated *R. viscosissimum* were made with borax-chlorate throughout the summer. Chemical problems were discussed with the operation supervisors. A mixture of borax-common salt is now recommended for the decapitation treatment instead of the borax-chlorate formerly used. The recommendations for chemical work in this region remain much the same as given for 1938 with the exceptions of minor changes shown in the 1939 and 1940 annual reports.

The ecological work described in part II of this report was the continuation of problems initiated in 1939 and the establishment of new plots to cope with the demand for additional information on grazing and forest management problems. The thorough investigation of three major grazing problems now confronts the methods project. The first of these studies will attempt to establish the most favorable time for the sheeping of recently cutover areas in relation to the eradication program. The second study will be used to determine the effects of deferring range use on areas previously grazed until adequate blister rust protection measures have been established. The third study will be used to measure the effects of known intensities of grazing on the development of ribes and western white pine. Progress on these studies is either reported for the first or second time in the 1940 annual report.

Two new one-acre areas were added to the upland ribes regeneration plot studies this past season on the Clearwater Forest. This now places

one or more of these plots on each of the blister rust operations in Idaho and Washington. One new forest ecological study was started this past season for the purpose of directly comparing the germination, growth and development requirements of the two major species of ribes and western white pine.

In the present report there is a list of the reports prepared in connection with laboratory and greenhouse work done at Berkeley during the winter of 1939-40.

PART I. DEVELOPMENTAL WORK IN METHODS OF RIBES ERADICATION

The tagging of ribes before eradication

A study was conducted on two 40-acre tracts during the 1939 field season, one located on the Mount Spokane and one on the Kaniksu operation, to evaluate the effectiveness of ribes removal by the tagging and regular methods of ribes eradication. A preliminary discussion of the results of these studies was presented for the first time in the 1939 annual report on pages 123-133 inclusive, for the Northwestern Region. The final report, Serial No. 108, will be distributed early in 1941. A brief summary is presented in the present report in order to make available the more complete conclusions reached by additional statistical studies.

In the tagging procedure, the ribes were first marked with white mechanics waste by experienced crewmen to facilitate the identification and subsequent removal of the tagged bushes by the regular eradication crews. This proposed new method of ribes eradication was intended originally to serve as a means of prolonging the normal working season after ribes defoliation had commenced, thus compensating for loss of time spent on fire suppression. It was later suggested that the tagging work might reduce searching time, increase the efficiency of ribes eradication during the summer season, and permit the immediate use of inexperienced labor for ribes removal without the training period heretofore considered to be necessary for the identification of ribes and the maintenance of systematic crew formations.

The data obtained from the results of studies by first working, mop-up and check operations for each method on the two areas have been statistically analyzed to permit an accurate correlation to be made between the results and to permit an unbiased interpretation of the analytical findings. The conclusions presented in part 1 deal with the analysis of the first working operation; those in part 2 deal with the efficiencies of first working as determined by the number of ribes found by the mop-up and check operations.

Completion of the field work was made possible through the assignment of blister rust crews by the supervisors on the Mount Spokane and Kaniksu operations.

Part 1 - The analysis of first working.

The statistical determinations for the results of first working proved that the regular method was more effective in the conduct of ribes removal work than the tagging method on total populations. This decision was reached from the following facts:

1. The amount of working time expended on total ribes by first working was found to be slightly lower for the tagging method on high concentrations and much greater than the regular method on low concentrations of ribes. The method means were found to have been drawn at random from truly homogeneous populations on both areas studied.

2. The total number of ribes pulled per man-day by first working, estimated from the total number of ribes present, was found to be higher for the regular method on both the high Mount Spokane and low Kaniksu ribes populations. The variance ratio of the method means was found to differ non-significantly among themselves.

3. The correlation between mean ribes and mean man-days within methods proved the regular method to be far more effective in the conduct of first working on both the high and low concentrations of ribes. The variance ratio between means within methods proved these values to differ significantly among themselves.

4. The regression of mean ribes per man-day between methods on each 40-acre tract proved that the random sampling did not accidentally represent different samples of a truly homogeneous population. The tagging method was found to have a slightly higher mean value for the Mount Spokane test and a lower one for the Kaniksu area.

5. The variance ratio between classes for working time proved means to be drawn from homogeneous populations on the Mount Spokane area and to differ significantly among themselves on the Kaniksu area.

6. The variance ratio between methods for working time proved means on the Mount Spokane and Kaniksu areas to differ significantly among themselves. The tagging mean was found to be slightly lower than that for the regular method on the Mount Spokane area and higher on the Kaniksu test.

7. Abandoning the class criterion of classification, the variance ratio determined for the number of ribes pulled per man-day proved the method means on the Mount Spokane test to differ significantly among themselves, and on the Kaniksu to be drawn from homogeneous populations. The regular method had lower values in seven out of 12 classes on the Mount Spokane area and higher values in nine out of the 11 classes for the Kaniksu tests.

8. Calculating the variance ratio for ribes per man-day without eliminating the class variation from the estimate of error, showed that the method means on both the Mount Spokane and Kaniksu tests were drawn from

heterogeneous populations. The class means on both Mount Spokane and Kaniksu tests were found to have been drawn at random from truly homogeneous populations. In comparison with tagging, the regular method was observed to have a lower mean on the Mount Spokane and a higher mean on the low ribes concentrations of the Kaniksu area.

9. The cost of $1.14 per acre for the Mount Spokane test and $0.28 per acre for the Kaniksu test for the white mechanics waste must be included as a charge against the tagging method.

Part 2 - The efficiency of first working.

The efficiency determinations between methods for first working proved the regular method to be superior to the tagging method in that fewer numbers of ribes were left on the areas after the initial eradication. This conclusion was based on the following facts:

1. Abandoning the class criterion of classification, the variance ratio showed that the method means for the percent of ribes missed per acre must have been drawn from truly homogeneous populations for the Mount Spokane tests. The regular method was found to have lower percentage values in 10 out of 12 possible population classes.

2. Recalculating the variance ratio for the percentage of ribes missed between method means without eliminating the class variation from the estimate of error for the Mount Spokane test, proved the class means to differ significantly among themselves and the method means to have been drawn from truly homogeneous populations. The regular method was observed to have a lower mean value of approximately 33 per cent for that attained by the tagging method.

3. Abandoning the class criterion of classification, the variance ratio for the Kaniksu test proved the method means to differ significantly among themselves. The regular method was represented by lower percentage values in eight out of 11 possible population classes.

4. Recalculating the variance ratio for the percentage of ribes missed between method means without eliminating the class variation from the estimate of error for the Kaniksu test proved the method means to differ significantly among themselves and the class means to have been drawn from truly homogeneous populations. The regular method was observed to have a method mean value of approximately 15 per cent lower than that attained by the tagging method.

RESULTS OF 1938 REWORK OF RIBES MONTIGENUM BY HAND, OIL, AND ATLACIDE IN COLORADO

On August 30, 1940, a check was made of the 1938 rework on Bison Ridge, Pike National Forest, Colorado. Thirty chains of check strip, one chain in width, were run across the area in south and west directions. A meandering check of 22 chains (one chain wide) was also made. On the total

area of 52 square chains examined for ribes, some 10 R. montigenum resprouts were found which had 136 feet of live stem. On the same area, 43 R. montigenum seedlings were found. Of these, 26 were of 1938 origin and 17 of 1939 origin. No current season seedlings were noted. From these figures it may be concluded that the 1938 hand rework on R. montigenum was successful and should be adequate for control.

Hand and chemical rework on Eagle Mountain was also checked on August 30. A 10-chain strip through the hand-worked area showed one R. montigenum resprout with 20 feet of live stem, and one R. montigenum seedling of 1938 origin.

Neither the oil nor the Atlacide rework on Eagle Mountain came up to control standards. On 14-1/2 chains of check strip through the Atlacide area, 71 missed and partly killed R. montigenum bushes were found. On 7-1/2 chains through the oil area, 23 R. montigenum were found. Table 1 shows the comparative efficiency of rework on R. montigenum by hand, oil, and Atlacide.

TABLE NO. 1

THE COMPARATIVE EFFICIENCY OF HAND, OIL, AND CHEMICAL REWORK ON R. MONTIGENUM, PIKE NATIONAL FOREST, COLORADO

Location of Work Block	Acres of Check Strip	Ribes Per Acre	F.L.S. Per Acre	Type of Eradication
Bison Ridge	5.2	1.9	26.2	Hand
Eagle Mountain	1.0	1.0	20.0	Hand
Eagle Mountain	1.4	50.6	2,210.0	Atlacide
Eagle Mountain	0.8	28.8	522.0	Oil

The killing action of the oil appeared to be generally satisfactory. Of the 418 feet of live stem which were found on the 0.8 acre of check strip, 250 feet of live stem were represented by two bushes which were not treated. The Atlacide was quite ineffective possibly because of the dilution caused by heavy autumn rains which occurred within a few days of the treatment in 1938. Dilution becomes a highly significant factor in the coarse gravelly soils typical of the granitic uplands of the Pike Forest. The oil tended to remain in the surface horizons of soil and did not leach away as rapidly as the highly soluble Atlacide. All work was done by WPA crews.

Comments on 1937 chemical plot work in Colorado and Wyoming

1. Diesel oil - Spray and soil drench of intact R. montigenum.

Bison Divide, Pike National Forest (see tables 6 and 7, pp. 134 and 135 of the 1938 annual report). No change in effectiveness. A small amount of dieback took place in 1939 but none was apparent for the 1940 season. Oil still detectable in the soil immediately contiguous to dead crowns. Generally satisfactory kill.

2. Atlacide - Spray and soil drench of intact R. montigenum.

Bison Divide, Pike National Forest (see table 7, p. 135 of 1938 annual report). No change in effectiveness. Results slightly less satisfactory on score of kill than Diesel oil. No further mortality occurred during 1939 or 1940.

3. Atlacide - Spray and soil drench of intact R. cereum (see table 7, p. 135 of 1938 annual report).

In 1938 a 93 per cent bush kill (5 live and 65 dead) was reported. In 1940, one sprouting bush and 62 dead bushes were found. On the basis of the 1940 check, a bush kill of 98.4 per cent was obtained. Four of the partially killed bushes had died during the 1939 season.

4. Sodium ethyl xanthate - Drench of decapitated R. cereum crowns (see table 6, p. 134 of 1938 annual report).

One bush reported as alive in 1938 was dead when 1940 check was made. No essential change in the kill during 1939 and 1940 and this chemical is still reported as unsatisfactory for ribes eradication work.

5. Diesel oil - Drench of decapitated R. cereum crowns.

Plot work and crew work were checked on Pike National Forest and Medicine Bow National Forest. Kill in 1940 still averaged 98-100 per cent as shown in table 5, p. 133, of the 1938 annual report, and as stated in the first paragraph on p. 170 and as shown in table 9 on the same page of the 1937 annual report. No delayed sprouting had occurred during the 1939 and 1940 seasons even from the largest composite crowns in rocky sites. Two sprouts were noted among 350 treated crowns.

6. Common salt - Spray and soil drench of intact R. cereum.

No apparent change from results given in table 7, p. 135, of the 1938 annual report. Bush kill about 15 per cent.

7. Diesel - Spray of R. inerme and R. cereum sprouts in talus slope (see table 16 of the 1937 annual report).

Work done by WPA crews. Results unsatisfactory. In 1940 there were 51 R. inerme sprouts and 10. R. cereum sprouts on a half acre of talus slope in the treated area.

General comments on ribes regeneration in Colorado and Wyoming

The ribes regeneration plots summarized in table 2 were established during the 1936 field season at several localities within Colorado and Wyoming control units. Although these plots are not adequate for a sampling of the ribes regeneration in Colorado and Wyoming, the data from these plots may be properly added to the fund of general observations made by Offord and

Chapman. The following comments are made chiefly on the results of random inspections of the various control units: (1) One working of R. montigenum will not place areas on maintenance. After initial work, the major regeneration occurs from broken crowns and layering stems. Seedlings will not be a problem in rocky upland sites in Colorado but may become one in the richer, deeper soils of upland draws in Wyoming. A second working of R. montigenum, if carefully done, should place areas on post check or maintenance, especially so in the rocky upland areas of Colorado. Shady draws and stream type should be watched for regeneration from seed. (2) The work on R. cereum has been highly effective except in loose rock jumbles where it was not possible to decapitate and treat individual crowns with oil. R. cereum appears to present little or no regeneration problem from duff-stored seed. The decapitation and oil treatment of large rock-bound R. cereum has been particularly satisfactory. No seedlings were visible around any of the decapitated and oiled crowns. Satisfactory control of R. cereum has been obtained in all sites where soil conditions permitted the bushes to be dug or pulled by regular methods. (3) The problem of R. inerme in willow swamps and its regeneration under these conditions is essentially the problem that has been successfully worked out in north Idaho. Inspection of willow-R. inerme sites in Colorado and Wyoming indicates that several workings will be needed to reduce this ribes species to control standards if hand methods only are used. Unless the present opposition to the use of mechanical methods in this region could be overcome, the task of permanently suppressing R. inerme would be a difficult one. The eradication of R. inerme from rock jumbles along talus slopes has not been satisfactorily accomplished. Fortunately these sites are not extensive in size or in number. (4) The 1940 inspection in Wyoming and the checking of previously established regeneration plots did not furnish any significant data or pertinent comments on the regeneration of R. lacustre, R. viscosissimum, and R. leptanthum. These three species occurred only in the Wyoming control area and were of minor importance in the initial eradication work.

In table 2 a summary is given of the regeneration data taken by Offord and Chapman. These data show what has actually occurred on a few selected spots but are not sufficiently extensive in themselves to form the basis for broad gauge conclusions or recommendations. Data shown in table 2 have been condensed from five detailed tables on file at Berkeley and Spokane.

TABLE NO. 2

REGENERATION OF RIBES IN COLORADO AND WYOMING, AS SHOWN BY GROWTH DATA AND SEEDLING COUNTS MADE IN 1937 AND 1940

Ribes Species and Locality	Number of Separate Plots	Area Disturbed (Sq. Ft.)	Linear F.L.S. Removed by 1936 Eradication	Ribes Conditions as Shown by 1937 Check	Ribes Conditions as Shown by the check of Aug. 28, 1940
R. inerme, Medicine Bow NF	15	1/ 280	2,340	101 F.L.S. 338 seedlings	54 F.L.S. 78 seedlings
R. inerme, Washakie NF	2	2/ 52	250	No sprouts 98 seedlings	No sprouts 25 seedlings
R. lacustre, Washakie NF	1	16	300	4 F.L.S. 5 seedlings	2 F.L.S. 2 seedlings
R. cereum, Medicine Bow NF Happy Jack	1	128	1,000	10 F.L.S. 66 seedlings	16 F.L.S. No seedlings
R. cereum, Medicine Bow NF Camp Blair	4	3/ No dist.	None	420 seedlings	26 seedlings
R. montigenum, Pike NF	2	112	2,400	6 F.L.S. 52 seedlings	46 F.L.S. 12 seedlings
R. montigenum, Pike NF	1	128	4/ 3,000	26 F.L.S. 5 seedlings	248 F.L.S. 15 seedlings
R. montigenum, Washakie NF	1	240	4/ 1,000	6 F.L.S. 6 seedlings	56 F.L.S. 10 seedlings

1/ Includes 64 sq. ft. of plots treated with common salt in 1937 on which no seedlings were subsequently found.

2/ Salt applied to 4 sq. ft. of one plot in 1936. Seedlings occurred on this treated area in 1937.

3/ One plot of 16 sq. ft. was treated with common salt in 1937 and still had 12 seedlings in 1940.

4/ Eradication work done in 1935.

LABORATORY AND GREENHOUSE WORK, NOVEMBER 1939 TO MAY 1940

Laboratory and greenhouse work undertaken at Berkeley during the winter of 1939-40 included: (a) routine care of the ribes garden and the greenhouse; (b) conduct of self- and cross-pollination tests on ribes garden plants; (c) preparation of special photographic material for research reports; (d) continuation of ribes seed germination tests. A brief statement giving the practical significance of the findings is here appended to each of the special reports completed during the period November 1939 to May 1940.

Serial No. 104

The Function of Tannin in Host-Parasite Relationships With Special Reference to Ribes and *Cronartium ribicola*.
-- H. R. Offord

This report gives a subject matter summary of all data pertaining to the tannin content of ribes species. By distributing this report to technical workers in universities and experiment stations, we hope to stimulate academic research on the mechanism of disease resistance in ribes and *Cronartium ribicola*.

Serial No. 105

The Use of Ropes in Ribes Eradication Work. -- L. P. Winslow

A reference manual which provides a convenient summary of data relating to: the strength and care of rope, methods of tying knots useful in camp and field work, and instructions for the care of workers along cliffs and other hazardous places. Descriptions are given of safety slings and a specially devised mechanical safety catch for safeguarding a worker suspended on a rope.

Serial No. 106

Fluids for the Preservation of Flowers and Fruits. -- C. R. Quick

Describes results of five-year tests on solutions for preserving the color of flowers and fruits of various ribes and recommends the following all-purpose preservative: 100 cc. of solution containing six cc. formaldehyde (40%), 25 cc. boric acid (4%), four cc. copper sulfate penta-hydrate (10%), four cc. ethyl alcohol (95%) and 61 cc. water.

Serial No. 107

Experimental Germination of Ribes Seeds. Series of 1939.
-- C. R. Quick

Reports seed germination tests in various soils collected from white pine areas in Idaho, Oregon, and California. Data show that there was no soil which prevented ribes seed from germinating. The growth rate of

seedlings and the green weight of seedlings grown in the various soils were generally high for those cultures which showed highest germination of seed. No consistent relationship was shown between the ribes population of the soil as collected in the field and the ability of that soil to grow ribes seedlings under experimental conditions.

Papers published during 1940, or those approved for outside publication, are as follows:

"Chemical and Mechanical Methods of Ribes Eradication in the White Pine Areas of the Western States."
--H. R. Offord, G. R. Van Atta, and H. E. Swanson.
U.S.D.A. Tech. Bull. No. 692, Jan. 1940.

"Blister Rust Control in the Management of Western White Pine."
--Kenneth P. Davis and Virgil D. Moss.
Station Paper No. 3. Nor. Rocky Mountain For. & Range Exp. Sta., June 1940.

"A Key to the Ribes of California." -- Clarence R. Quick.
Bur. Ent. & P. Q. MS 5166, Berkeley, Calif. Oct. 15, 1940.

In the spring of 1940, tests were made on the hand pollination of R. roezli, R. glutinosum, and R. gracillimum growing in the ribes garden at Berkeley. These tests, as well as those subsequently made in the field in California and Idaho, show that ribes seldom, if ever, produce mature fruits as a result of self-pollination. A report on this work is given by C. R. Quick in section 3 of the 1940 annual report for the Sugar Pine Region.

STATUS OF RECOMMENDATIONS ON SPECIAL METHODS OF RIBES ERADICATION AND NEW DEVELOPMENTS OF 1940

Recommendations

No changes are made in recommendations for methods and equipment given as items (1) to (5):

(1) Light or medium weight claw mattock.
(2) Use of dynamite.
(3) Broadcast spraying with Atlacide or Diesel oil.
(4) Bulldozer methods for brush removal in stream type.
(5) Use of D-2 Caterpillar tractor equipped with front end brush rake and rear end power hooks.

For a description of these methods and recommended equipment, reference should be made to the 1939 annual reports for the Sugar Pine and Northwestern Regions.

Decapitation and chemical treatment of ribes. Recommendations are the same as given in 1939 report for oil work and for methods of applying dry chemical. In the latter, however, a new formula is given. Use a mixture of

one part by weight of borax (tech. powder), and one part by weight of common salt (vacuum refined table and dairy salt).

Developments of 1940

In reviewing the results of the 1940 field season, the following observations and conclusions refer briefly to the newer developments which may find practical application in the control of blister rust.

No special comments are made at this time regarding the bulk of the ecology studies (ribes regeneration in relation to fire, logging, timber management, and eradication methods).

(a) Results of pollination tests on ribes flowers definitely show that wild ribes are rarely, if ever, self-fertile and that cross-pollination must occur before such plants can produce mature fruits. This conclusion has an important bearing on long-range planning of eradication work and gives promise that continued man-caused reduction in ribes populations should be aided in its final stages by natural phenomena.

(b) Results of the 1939 tests with dry chemical offer for consideration a mixture of dry borax and common salt as a definite improvement over the chlorated borax or straight borax as previously recommended. The new mixture of borax and common salt should have wider application in all regions, especially on National Park land where considerable importance is attached even to a rumor that a chemical may be toxic to wild life. The new mixture has the further advantages of being cheaper and easier to handle than the one previously used.

(c) Several new tools of the peavey type have been tested and found useful for eradication work in thickly populated stands of _R. roezli_ (or any ribes difficult to dig) where the work is heavy and slow with the regular mattock.

(d) The investigations that were made regarding the operation of the small trail tractor designed by Region Six of the Forest Service have drawn our attention to a type of equipment which conceivably would make an effective contribution to the blister rust program for camp construction work, for the servicing of small camps away from motor roads, for construction of trails, for cutting manways in brush fields, and finally, for the actual eradication of large troublesome ribes. One of these special tractors equipped with a single drum logging winch and a brush rake (to be replaceable with a mull board for trail construction) would cost $3,000. It is to be hoped that either the Bureau or the Forest Service can assign such a tractor to blister rust work in the Far West during 1941.

(e) The effectiveness of hand grubbing work was improved by employing the D-2 Caterpillar tractor to make manways across troublesome brush fields. Manways were cut some six weeks ahead of the regular crew eradication work, thus permitting broken-off ribes crowns to sprout.

PART II. ECOLOGY STUDIES FOR 1940

The effects of variable light and moisture conditions on the germination, growth and development of R. viscosissimum, R. lacustre, and Pinus monticola.

In the western white pine region it has always been difficult to explain for a given area, (i.e., one undergoing stand improvement practices, commercial logging and ribes eradication) the ecological reaction of ribes and white pine seedlings under the wide range of environmental conditions represented. Oftentimes, it has been observed or reported that one species of ribes appeared to be developing far better than the other, or that both species were noticed to be developing in about the same manner. In other cases, ribes appeared to be more vigorous than the white pine seedlings, or the pine appeared to be in a healthier state than the associated ribes. Since no intensive study has ever been made for the purpose of segregating the germination, growth and development requirements of the two major species of ribes and western white pine under the same environmental field conditions, it has been impossible to answer many of the above questions relating to growth requirement. Before further recommendations can be made on the extent to which forest management may aid or impede the suppression of ribes, it was considered necessary to undertake an intensive controlled study to determine the light and moisture requirements of white pine and the two most troublesome species of ribes. If noticeable differences are found to exist either between the two ribes species or between ribes and white pine, then management may find it possible to give even greater aid in the suppression of ribes than is now made possible from the present ecological knowledge. Such information will also greatly aid in the solution of problems on the regeneration of ribes subsequent to eradication work.

After an exhaustive search had been made throughout the white pine region of northern Idaho, an area was finally located in the Kaniksu Forest which met the requirements of an adequate site in which environmental conditions were suitable for the proposed tests. The area selected is known as the Hannah pre-logging disposal unit. On this unit all defective and unmerchantable trees have been felled and the flash fuel piled and burned. Three variable light stations were selected in or near the pre-logging unit. Station 1, representing a full sun site, and station 2, representing a half shade condition, are within the pre-logging block. Station 3, a full shade station, lies north of the pre-logging unit in an identical but virgin stand of timber. The topography, soil and forest floor conditions are considered to be adequately uniform throughout the three stations. The Hannah area represents a level terrain of glaciated deposits.

Each of the three light stations is represented by three plots. The surface of plot 1 is composed of natural undisturbed duff cleaned only of debris and shrub growth. The surface of plot 2 represents mineral soil which was obtained by removing the duff and humus layers. The surface of plot 3 represents a burned-mineral condition. This latter series was obtained by piling for the most part flash fuel over the natural site and burning until practically all the organic mantle had been consumed down to mineral soil. These three surface conditions, duff, mineral and burned-mineral, represent the three major types of soil surface found in the white pine type.

The variations of any one classification can largely be determined by an adequate statistical analysis of the results obtained from the germination, growth and development studies of ribes and white pine on the three major surfaces.

The exterior dimensions of each plot were first trenched to a depth of two feet or more in order to cut off all root competition. In so far as practicable, this assured control and uniform distribution of moisture throughout the plots. The individual plots were next fenced with 3x3 mesh hardware cloth to guard against rodent damage. This cloth was buried to a depth of 10 inches in the trench before covering, had a surface height of 18 inches, and then flanged outward at a right angle for a distance of eight inches. The eight-inch flange served to prevent rodents from entering the plots if they crawled up the 18-inch surface fence. Over the top of these rodent-proof pens were placed removable covers constructed of wooden frames and covered with one-inch mesh chicken wire. These covers served to prevent birds or large rodents from entering the plots after the seed had been sown. Late in the fall of 1940, these chicken wire covers were removed and the protection replaced by laying ordinary screen directly over the seedbeds. This was done to prevent heavy snows from crushing the covers and pens and to give protection to the seedbeds during the winter in case rodents or birds entered the plots. This screening will be removed the first thing next spring and the covers replaced for the growing season. All the labor used in the construction of the rodent- and bird-proof pens, as well as the material for the wooden frames, was furnished by the Forest Service, for which grateful acknowledgment is made.

Each plot was subdivided into twenty two-foot adjacent squares, five squares or subplots long and four wide. The accompanying photographic illustration shows the arrangement of two-foot square seedbeds. A one-foot buffer strip was placed around the subplots between the seedbed and the fence. At one end of the plot three ten-inch adjacent strips, running the width of the plot, were established with a buffer strip between the fence and also between the strips and the subplot seed beds. These strip plantings are to be used for the purpose of studying the development of roots for the two species of ribes and for white pine seedlings. The boundaries of each subplot and the strips were laid off with string lines. The wooden stakes used to mark the boundaries were all placed in position and properly adjusted in the buffer strips. This was done for the purpose of utilizing all available seedbed space and to keep all foreign material directly out of the subplots.

The seed of R. viscosissimum and R. lacustre was collected and extracted from the fruits about the middle of August. The fruits of R. viscosissimum were collected off the Pyramid Pass area, and those of R. lacustre off the Pass Creek Pass area, both being located in the Kaniksu Forest. After the seed had been extracted, dried and thoroughly cleaned, it was stored at room temperatures until the date of sowing. The pine cones were collected about the 25th of September from the Granite Creek area also located in the Kaniksu Forest. The seed was extracted from the cones by kiln drying at a temperature of 122° F. This work was done by the Forest

Service Savenac Nursery located at Haugan, Montana. Germination tests will be conducted for all samples of seed at the Berkeley laboratory.

Having practically no information on the percentage of new ribes seed germinating under field conditions, it was decided to sow both species of ribes at the rate of 800 seeds per square foot. This should insure adequate germination and at the same time, if germination should become too heavy, permit the number of seedlings to be thinned until a desired population is reached. The samples of 800 seed were obtained by first counting out five groups for each species of ribes. Each group was then measured in a graduated vial and the mean height of the five samples used as the basis for measuring field samples at the time of sowing. During the course of seeding, 10 measured groups of seed for each species of ribes were selected at random and later counted to determine the percentage plus or minus variation from 800. The measurement of the 10 counted groups for each species was found to vary less than one per cent. The mean variation for R. viscosissimum showed a plus of .05 per cent, and for R. lacustre a plus variation of .05 per cent. The white pine seed was counted out by groups of 100 seed and packaged before going into the field. Each package of 100 seed was then used to sow an area of one square foot.

The random method of subplot selection was used to determine what each two-foot square was to represent. This was accomplished by taking one-inch square pieces of cardboard and writing on the words, R. viscosissimum, R. lacustre, Pinus monticola, and check. These cardboards were then placed in a tall can and shaken before each draw. After one card was removed it was not replaced until all four cards had been taken. Drawings for subplot locations were done for the widths of the plots, since each plot was four subplots wide. Maps were made before the drawings and these showed the arrangement of the subplots and also the three 10-inch strips at one end. As each card was withdrawn from the can, the name shown on the card was written on the subplot selected. This was continued until all subplot blanks had been filled in and the selection of seed made for the 10-inch strips. The drawing for subplots always commenced in the left hand corner at opposite ends from the 10-inch strips. Each plot map was completely filled in before going into the field.

A two-foot square lath frame was constructed and subdivided into one-foot squares marked off with a light copper wire. This frame was placed over each subplot to permit the seeding by exactly one-foot squares. An assistant measured out the ribes seed which was checked by the author before sowing. The ribes seed was sown by running the seed gradually over the forefinger with the use of the thumb. This permitted an equal distribution of the seed over the surface to be sown. The exterior boundaries of each one-foot square were first sown in order to obtain uniform distribution along the margins and at the same time keep the seed within the boundaries of the subplot. This method of sowing ribes seed not only proved to be quite rapid but very satisfactory in obtaining a uniform distribution over the entire one-foot square surface. The pine seed was sown by dropping individual seed approximately one inch apart. This method seemed to be the only way in which a uniform distribution could be obtained over the surface to be sown. The

LIGHT MOISTURE STUDIES

Full Shade Station

Duff Plot

0 — 1 — 2 FEET

Germination, Survival and Development Seed-bed Studies

Ribes Viscosissimum	Ribes Lacustre	Check	Pine
Pine	Ribes Viscosissimum	Ribes Lacustre	Check
Check	Ribes Lacustre	Ribes Viscasissimum	Pine
Ribes Lacustre	Pine	Ribes Viscasissimum	Check
Ribes Viscasissimum	Check	Pine	Ribes Lacustre

Raot-development Seed-bed Studies

Ribes Viscasissimum
Pine
Ribes Lacustre

10-inch strips were sown at about the same rate except the seed was neither counted nor measured. The seeding of the plots commenced on October 28, and was completed on October 31. Seeding before this date in the burned-mineral plots was made impossible because the fire restrictions of the region were not removed until the 15th of October.

Hydrogen-ion determinations were made for three soil samples of each plot at the three light stations. These were obtained for the surface, six-inch, and 12-inch layers. The soil samples were collected and sent immediately to the Berkeley laboratory where the pH tests were made December 6-9. Just before sowing, samples will be taken each year at about the same time. The results of the pH determinations are shown below for the plots of each light station.

TABLE NO. 3

pH MEASUREMENTS OF SOIL SAMPLES TAKEN FROM HANNAH ROAD PLOTS, LIGHT CONDITION AND SOIL SURFACE AS SHOWN

Duff Plot	pH	Mineral Plot	pH	Burned-Mineral Plot	pH
Full Sun Station					
Surface sample	5.04	Surface sample	5.99	Surface sample	7.49
6-inch sample	5.57	6-inch sample	5.67	6-inch sample	5.59
12-inch sample	5.79	12-inch sample	5.92	12-inch sample	5.62
Half Shade Station					
Surface sample	5.29	Surface sample	5.79	Surface sample	7.22
6-inch sample	6.01	6-inch sample	5.97	6-inch sample	6.05
12-inch sample	5.90	12-inch sample	5.72	12-inch sample	5.92
Full Shade Station					
Surface sample	5.36	Surface sample	6.01	Surface sample	7.20
6-inch sample	5.92	6-inch sample	5.38	6-inch sample	5.58
12-inch sample	5.90	12-inch sample	5.63	12-inch sample	5.92

It is interesting to note that the alkaline concentration of surface samples for the burned-mineral plots increased from full shade to full sun stations. This trend follows exactly the ease with which the slash was burned to consume the organic mantle down to mineral soil. It was necessary to refuel and burn the half shade and full shade plots three times before most of the organic mantle disappeared, whereas, the full sun station required only two burnings. Another interesting point is noticed in regard to the differences of the surface samples for the duff plots. The highest acid (i.e., lower pH) condition was found to be present on the full sun station, and this concentration decreased as the amount of shade increased. The six-inch and 12-inch samples show variations which have been influenced by the composition of the decaying organic mantle.

These studies of the light and moisture requirements of ribes and western white pine seedlings will continue over a period of five years. During this time, information will be taken on the germination of seed, survival of seedlings and their growth and development. Root studies will also be made of the two species of ribes and western white pine which have been

planted in the 10-inch strips. The soil moisture content will be measured for each plot at about ten-day or two-week intervals during the growing season. A number of other observations, such as soil temperatures and air temperatures, will be made on the plots in cooperation with the Northern Rocky Mountain Forest and Range Experiment Station.

<u>The effect of grazing by sheep on the germination, growth and development of ribes and western white pine on recently cutover areas.</u>

This study was described for the first time on page 138 of the 1939 annual report for the Northwestern Region. Since the 1939 field season, the scope of the grazing studies has been greatly extended to meet the demand for additional information and a larger sampling of the grazing problem. One additional exclosure was established on the Clearwater and two new plots on the St. Joe Forest this past season. There are now a total of three grazing exclosures on the Clearwater and two under observation on the St. Joe Forest. Plots 1 and 2 are located about 1/2 mile west of the blister rust headquarters, and plot 3 about two miles northwest of Pierce, Idaho. All three of these plots are located in the Clearwater Forest. Plots 4 and 5 are located in the St. Joe Forest on Scaler Creek in the upper drainage of the St. Maries River. These five plots now represent both the early and late season grazing units as well as the wide range of grazing conditions on the two forests.

The purpose of establishing these studies on recently cutover lands is to determine the effect of sheeping on the germination, growth and development of ribes and western white pine in relation to the control of blister rust. Each exclosure has been established on a cutover area prior to any grazing but long enough after logging to permit the bulk of ribes seedlings to appear from the major disturbance. Observations will be made on these plots for at least five years in order to study the effects of sheeping on new germination and survival of seedlings on each year's growth and ultimately on ribes fruiting.

The results of preliminary observations on many of the grazing units located in the Clearwater and St. Joe Forests have shown certain facts to be true in regard to the effects of sheeping. Dependable conclusions, however, cannot be drawn without intensive studies over a period of years. Early studies have indicated that sheeping results in a material loss of leaves, terminal buds, and some loss of live stem, and that an occasional ribes is destroyed. Nothing is known, however, of the possible increase of new ribes caused by sheeping, or the increase in leaves, main stems, laterals, total live stem, and height of bush. If eradication difficulties are also enhanced, the total effect of sheeping may substantially intensify the blister rust hazard on recent cutover areas. The results of one or even two seasons of intensive grazing observations cannot hope to answer many or all the grazing problems, the reason being that the extent of browsing or disturbance does not remain constant for any one year but varies with the time of day, day of the grazing season, and finally, with the composition of the band of sheep on the area. Early morning or late evening grazing is known to be much more complete than midday. The taste or selec-

tion of browsed plants varies throughout the grazing season. The extent to which ribes are browsed depends upon plant associations as well as the degree to which the range has been utilized. The degree of browsing depends a great deal on the composition of the band, whether it is composed entirely of ewes, entirely of lambs, or of various proportions of the two. Early data obtained from these series of studies can only hope to point out or indicate particular trends resulting from the effects of sheeping on recently cutover lands.

The data obtained from a two-year study of plots 1 and 2 located on the Clearwater Forest are shown in table 4. The effects of sheeping to date on ribes have shown a possible increase of main stems, a noticeable increase of laterals, total feet of live stem, and a greater number of leaves per browsed bush. Responsible for this morphological increase has been the browsing of terminal buds. Each terminal bud nipped in 1939 has been followed by new laterals or an occasional main stem in 1940. The immediate effects of sheeping have been a small loss of total ribes, a slight decrease of live stem, and heavy browsing on both the leaves and terminal buds. Just how sheeping will ultimately affect the germination, growth and development of ribes can only be determined by studying means and deviations over a period of years.

TABLE NO. 4

THE RESULTS OF TWO SEASONS' GRAZINGS
ON THE DEVELOPMENT OF RIBES
IN THE CLEARWATER FOREST

Plot Number	Date Checked	Total No. Ribes	Main Stems		Laterals		Total FLS	Ave.Ht. Per Bush in Ft.	Leaves		Terminal Buds	
			No.	FLS	No.	FLS			Total	Per Bush	Total	Per Bush
Exclosure-1	9/21/39	79	81	27.56	63	3.62	31.18	.19	553	7.0	144	1.8
(Not grazed)	9/25/40	78	86	30.93	76	9.96	40.89	.35	858	11.0	155	2.0
Check - 1 (Grazed)	9/21/39	95	97	33.98	109	7.88	41.86	.32	817	8.6	206	2.2
	9/27/39	92	94	30.26	104	7.05	37.31	.31	361	3.9	182	2.0
	9/25/40	89	96	48.48	244	53.05	101.53	.63	2,067	23.2	303	3.4
	10/7/40	89	96	47.82	244	51.44	99.26	.61	1,103	12.4	292	3.3
Exclosure-2	9/22/39	35	38	13.78	46	4.23	18.01	.33	308	8.8	84	2.4
(Not grazed)	9/26/40	35	41	21.03	59	10.73	31.76	.52	464	13.3	96	2.7
Check - 2 (Grazed)	9/22/39	26	32	14.52	32	2.89	17.41	.36	237	9.1	64	2.5
	9/28/39	19	25	11.79	30	2.35	14.14	.34	134	7.1	48	2.5
	9/26/40	17	30	24.55	67	6.70	31.25	.78	526	30.9	94	5.5
	10/8/40	17	30	23.64	67	6.28	29.92	.77	311	18.3	86	5.1

Other information being recorded by these studies is the disturbance responsible for ribes germination, year of origin of each bush, new main stems and new laterals. The amount of new live stem growth is being recorded each year as is the height of bush. The total number of leaves are taken at each check, the number browsed immediately after the area has been

grazed and the per cent of leaf surface. Each exclosure is checked twice during the growing season. The first check is made the early part of June and the second or fall check during the month of September. The controls are checked three times each season. If the area is to be sheeped early, the plots are checked before and after grazing plus the mid-September check. If the area is to be sheeped late, the controls are checked first in June and then before and immediately after grazing which is done about the middle of September. The dates of grazing and the composition of the bands, the number of ewes and lambs, are recorded each season. The forage density and height of browsed material were first taken before the sheep entered the new grazing units. This information is then recorded each year in early June and late September in order to determine the percentage of forage browsed in relation to the damage of ribes and white pine. Complete information is being taken at the times ribes are checked on new white pine germination, mortality and injury which is classed as resulting from browsing or trampling. The Northern Rocky Mountain Forest and Range Experiment Station is cooperating on these studies by recording the effects of sheeping on all coniferous reproduction. It is interesting to note that to date, no damage has been observed on white pine reproduction where grazing was restricted to less than 50 per cent of the carrying capacity of the areas. Grazing above this percentage figure has resulted in some terminal bud nipping which becomes heavier as grazing increases above the carrying capacity of the areas. Trampling does not become serious except along driveways, on overgrazed areas and on steeper slopes.

The ribes data obtained from one year of grazing on plots 3, 4, and 5 show almost identical trends as did the results for plots 1 and 2 shown in table 4. One interesting observation that has been made on many of the plots is the number of terminal buds nipped by deer. Out of a total of 664 terminal buds recorded on the control of plot 5, sheep had nipped 247 buds and deer 125. This information is carefully segregated for all the controls in order to determine the effects of both sheep and deer on the ribes suppressional problem. Another point of considerable interest in regard to the browsing of leaves early in the season is that secondary or axis buds appear shortly after the leaves are removed, and in many instances two leaves replaced the loss of one. This was especially noticeable where <u>R. lacustre</u> had been heavily browsed. Complete information on these studies will be presented in the 1941 annual report after all controls have been subjected to at least two years of grazing.

<u>The effects of deferred grazing on the germination, growth and development of ribes and western white pine</u>.

This study was started during the 1940 season for the purpose of attempting to establish the most favorable time of grazing on recently cutover areas in relation to the eradication program. It has been rather a common occurrence in the past to have most of the recently logged areas sheeped for a number of years prior to and before adequate blister rust protection measures could be applied. Just how seriously, if at all, this procedure has affected the efficiency of ribes eradication is not known. It is the common belief, however, that sheeping is responsible for the

large portion of stunted ribes bushes occurring on these areas. The dwarfing of ribes bushes is caused by the constant nipping of terminal buds. The extent to which sheep will nip terminal buds has been observed to depend upon the severity of grazing. On areas now badly overgrazed, this problem of stunted bushes is found to be most common and troublesome.

There are two important questions relating to the time of grazing on recently logged areas in the western white pine type. Should sheeping be allowed on cutover areas before or after adequate blister rust protection measures have been applied? This question is being studied on the Clearwater and St. Joe Forests from the five exclosures and controls established on recently logged areas which have not as yet been grazed. The second question deals with the correlation of grazing with the eradication of ribes from areas which have been sheeped for a number of years. On many of these areas, it has been difficult to obtain adequate protection because of the large number of small and stunted ribes bushes which are toublesome for the eradication crews to find. This study of deferred grazing will compare the development of ribes within exclosures which have been previously browsed for a number of years with the ribes development on the controls which will continue to be browsed.

Two exclosures were established on the Hollywood area in the Clearwater Forest. These exclosures will defer grazing of ribes, western white pine, and all other associated plants. A total of 39 ribes were found in exclosure 1, and 44 ribes in exclosure 2. Two controls of equal size have been established for each exclosure. This was done in order to obtain about equal numbers of ribes and pine on areas subjected to grazing and on those deferred from grazing. The controls for exclosure 1 have 34 ribes, and the controls for exclosure 2 have 60 ribes. The results of one season's grazing have shown a reduction of leaves and terminal buds on the controls with little or no change in the amount of total live stem. Information such as main stems, laterals, total live stem, bush height, etc., are being recorded for this series of studies as was explained for the five exclosures established prior to grazing on recently logged area. Interest in this study centers primarily on rapidity of growth of stunted ribes and injured pine in comparison with associated vegetation and also on the effects of constant grazing on the controls.

The effects of controlled grazing on the germination, growth and development of ribes and western white pine.

This study is being carried on in cooperation with the University of Idaho and Potlatch Forests, Inc. Its purpose is to determine the effects of known intensities of grazing on proper range utilization. Once this question is answered it will be possible to recommend grazing practices for the western white pine cutover type which will not deplete the range or seriously affect the development of young forest reproduction. The experimental procedure in this study differs from the exclosure type by taking certain numbers of sheep and placing them within an inclosure for a definite grazing period. In this study the Bureau is recording ribes data and cooperating to the fullest extent whenever possible, otherwise all other infor-

mation is being obtained by student labor in the summer employ of Potlatch Forests, Incorporated.

The area selected for study by the personnel of Potlatch Forests is located on the Deer Creek drainage in the Clearwater Forest. Three areas were fenced adjacent to each other for observation. The two outside areas are the inclosures on which grazing will be permitted. The inside area is the control or check which excludes all grazing. Each of the inclosures has an area of 2-1/2 acres which is divided about equally into north and south exposures. These areas were fenced during the early part of the 1939 summer season. The timber previously on this area was cut in 1936 and the slash piled and burned that fall. A light residual stand is composed of pole size white pine and a few merchantable 16-inch plus trees of white fir, spruce, cedar, and some larch. The area was sheeped lightly during the summers of 1937 and 1938. The first ribes information was taken August 3, just prior to the 1939 grazing in the inclosures. This was followed by a check after grazing, which was obtained on August 22 of the same year. The 1940 check before grazing was made the latter part of July and the check after grazing was obtained on the 23rd of August. The sheep were placed in the inclosures on the third and fourth days of August. A total of 50 head of sheep have been placed each season in the separate inclosures. The sheep were held within inclosure A for three days, and within inclosure C for two days. The results of two years' grazing within the inclosures and deferred grazing of the control are shown in table 5.

TABLE NO. 5

THE RESULTS OF CONTROLLED GRAZING ON THE DEVELOPMENT OF RIBES

Plot No.	Date Checked	Total Number Ribes	Feet of Ribes Live Stem		Average Height Per Bu. in Ft.	Leaves	
			Total	Per Bush		Total	Bush
Inclosure A (Grazed)	8/3/39	11	24.83	2.3	.92	333	30
	8/22/39	13	28.38	2.2	.77	240	19
	7/24/40	16	49.57	3.1	.93	522	33
	8/23/40	15	44.16	2.9	.90	78	5
Control B (Not grazed)	8/3/39	6	24.50	4.1	1.03	268	45
	7/24/40	12	40.04	3.3	1.06	479	40
Inclosure C (Grazed)	8/3/39	13	28.50	2.2	.95	305	24
	8/22/39	14	27.54	2.0	.83	229	16
	7/24/40	14	50.49	3.6	1.16	395	28
	8/23/40	14	50.23	3.6	1.15	279	20

The results of known intensities of grazing on ribes to date have shown a greater reduction of leaves on the area sheeped for three continuous days. Changes in the total number of ribes on the areas can be attributed to a more careful check during the 1940 season. All increases in total ribes shown in table 5 must be considered as established bushes which were found for the first time by the 1940 check. This study was not turned over

to the methods project until 1940. The results of the 1939 check were found to be all in order except that not all ribes on the areas had been located. The results of the 1940 check after grazing within inclosure A shows a reduction of one ribes bush. This ribes was a small bush badly stunted by the 1937 and 1938 grazing which may have been removed or possibly nipped nearly to ground level this past season. It will not be reported, however, as removed by sheep until the 1941 check since it may have been missed or will resprout from the root crown. Observations must be made on these areas a number of seasons before any definite conclusions can be reached upon the effects of different grazing intensities on the development of ribes and western white pine.

The growth and regeneration of upland ribes following the eradication of the more troublesome types in the western white pine region.

During the 1939 field season, seven one-acre plots were established for the purpose of studying the regeneration of upland ribes following the initial and each succeeding eradication disturbance. These plots have been established on the more troublesome eradication types such as cutover, open reproduction, and brush where new ribes seedlings would be most likely to appear following each eradication. A number of observations of these types made by the methods project reveals that so often in the past the physiologically dwarfed ribes have been mistaken for new seedlings and that consequently, ribes regeneration is not at all serious in this region except succeeding a logging disturbance. The seven plots initiated in 1939 to study this question are located on the St. Joe, Coeur d'Alene, Mount Spokane, and Kaniksu blister rust operations. In 1940, two additional regeneration plots were established in cutover and open reproduction types on the Clearwater Forest. This now provides one or more plots of this series on each of the operations in the states of Idaho and Washington.

After the plots had been located and properly marked, a complete check was made of all ribes before the initial eradication. Each ribes was recorded by live stem class, keeping the species segregated. A total of eight live stem classes were made which are shown in table 6. By taking these data before the initial eradication, the original number of ribes and feet of live stem can be used as the basis for determining the extent of disturbance and the resultant germination of ribes seedlings.

Table 6 shows the results of such a check on three different eradication types which are located within the same drainage. New seedlings for R. viscosissimum in open reproduction have been found to increase from one in 1939 to seven in 1940. The cutover type had originally the larger number of ribes seedlings present which came in succeeding the 1937 logging disturbance. The eradication crews were able to reduce the number of seedlings by 12 on the initial eradication. For all types represented, the eradication crews reduced the original ribes population on open reproduction by 78 per cent, brush 71 per cent, and cutover 65 per cent in the removal of R. viscosissimum. The reduction in the amount of live stem has been exceedingly high for all types. The initial eradication reduced the original R. lacustre

population on the open reproduction type by 64 per cent, brush 59 per cent, and cutover 48 per cent. The lower reduction of total ribes usually has been found to accompany the type having the larger number of ribes in the smaller size live stem classes.

TABLE NO. 6

THE RESULTS OF NEW RIBES REGENERATION SUCCEEDING BY ONE YEAR THE INITIAL ERADICATION DISTURBANCE ON THREE MAJOR FOREST TYPES

Type	Year Check	Seed- lings	Number of Bushes Grouped by Feet of Live Stem Classes 0-1	1.1- 5.0	5.1- 10.0	10.1- 25.0	25.1- 50.0	50.1- 100.0	100.1+	Total No. Bu.	F.L.S.
R. viscosissimum											
Open Reproduction	1939	1	135	593	388	438	303	189	70	2,117	45,595
Cutover	1939	54	78	158	37	32	4	2		365	1,557
Brush	1939		12	80	65	129	150	95	53	584	23,607
Open Reproduction	1940	7	249	178	24	5	4			467	892
Cutover	1940	42	61	21	2	1				127	108
Brush	1940	1	33	72	25	32	8			171	1,310
Total All Types	1939	55	225	831	490	599	457	286	123	3,066	70,759
	1940	50	343	271	51	38	12			765	2,310
R. lacustre											
Open Reproduction	1939		28	47	13	13	3	2		106	667
Cutover	1939	12	55	69	15	7	4	1	1	164	763
Brush	1939		10	54	23	32	13	7	3	142	2,295
Open Reproduction	1940		19	17	2					38	61
Cutover	1940	18	53	13	2					86	69
Brush	1940		15	35	5	3				58	172
Total All Types	1939	12	93	170	51	52	20	10	4	412	3,725
	1940	18	87	65	9	3				182	302
All Species	1939	67	318	1,001	541	651	477	296	127	3,478	74,484
All Types	1940	68	430	336	60	41	12			947	2,612

The three areas illustrated in table 6 were worked during the latter part of September when the efficiency of ribes eradication is considered to be at its lowest. This study will not attempt to measure the efficiency of the eradication work or of the checking work, but will be used to correlate the disturbance caused by the removal of ribes with the regeneration of new seedlings. The interesting point in regard to the information obtained from the seven plots to date is that very few seedlings have been found to appear following the initial eradication. This picture may change, however, within the next year, since oftentimes the germination of ribes seed is delayed for at least two years following a mechanical disturbance. Complete information will be presented in the 1941 annual report after two years have elapsed since the initial eradication. In 1941 it may be possible to determine the number of new seedlings germinating on the different types when based upon both the original ribes population and the number of ribes re-

moved by the first eradication. Much information can also be given on the number of missed bushes and resprouts following the initial work and the development of resprouts in building up live stem.

TOOLS AND DEVICES FOR ASSISTING THE FIELD CREWS IN RIBES ERADICATION

By
John F. Breakey
Assistant Pathologist

Portable camp units originally built to last three seasons have passed through their fifth summer and are still in fair condition. Worn parts are replaced, collapsible messhall benches have been rebraced and wedged.

Trucks and cars are repaired and reconditioned in shops maintained at Clarkia and Kalispell Bay, Priest Lake, Idaho. Truck racks and cabs are repainted following the replacement of broken or damaged parts. Chassis are rebushed, clutches and brakes are relined and motors tightened and retuned. Motor testing apparatus consisting of a combustion analyzer, a battery starter tester, a compression tester, a vacuum tester, a power timing light and Dwell-Tach tester were put into service. This equipment makes it possible to tune and adjust worn motors back to new car performance. Photo W 2656 shows trucks ready for camp supply service.

Drawings of the new claw-mattock ribes tool (see W 28 right and W 4) were supplied and supervision of the construction of 2,500 new tools for the U. S. Forest Service was furnished. Number 1077 carbon steel was used to get a strong tool that will not break down. All old ribes tools, approximately 1,200, were reshaped and oil tempered in the blacksmith shop at Clarkia.

In picture W 28 the tool on the right is the latest type of high carbon steel tool with sturdy, wide jaws. The tool on the left is the one used in 1937. Picture W 4 shows the latest model tool in detail.

The 32 inch second growth hickory handle has been accepted as the standard for ribes tools. For all tools placed in general use in the field it has been the practice to get a well shaped handle and hold to one pattern.

W 28. Clow mattock at left used in 1937. Claw mattock at right used in 1940. 32 inch second growth hickory handle in background

W 4. Latest model of ribes tool

W 2656. Blister rust trucks repaired at the Clarkia shop

PHOTOGRAPHIC AND EDUCATIONAL WORK, 1940

By

Edward L. Joy, Forester

H. Miller Cowling, Chief Scientific Aid

The photographic and educational work of 1940 followed the same general pattern of the work of this project for the past several years. The photographic department, under the supervision of Mr. Cowling, includes reproducing by Multilith and black line printer as well as the strictly photographic phases of still and motion picture taking and laboratory processing. All of these services are provided for both the Northwestern and Sugar Pine Regions. During the past year another Bureau project, Pear Psylla Control, was also serviced by this department on a cooperative basis. The latter involved use of some equipment by competent operators from their personnel for production of their needs, although strictly photographic work was handled by technicians of this office.

Educational activities, which do not have the services of a full time supervisor, were handled by various members of the personnel along with their regular duties. An addition in this field during 1940 was a 900-foot all color motion picture on blister rust and its control. For a short period during the late summer one temporary assistant was used to handle this film for camp and other showings.

Details of the photographic and educational work done in 1940 are given in the following accounts:

A. Photographic Section

The objectives of the photographic department are (1) to maintain a pictorial record of all phases of investigative and control work, (2) to provide the supervisory field personnel with photographs and maps which will facilitate control work, (3) to enlarge or reduce maps and charts to the sizes suitable for reports or field use, and (4) to provide illustrative material for educational purposes.

During 1940 all types of work outlined were continued. Field trips were made to all of the Northwestern Region operations and to the Sugar Pine Region in order to secure up-to-date illustrations of all types of control and investigative work. In the laboratory reproductions were made of charts, tables and maps for the annual report, special reports, and other uses. Enlargements of maps of various sizes to meet the needs of both reports and field uses were made by photographic process. For educational work enlargements for coloring, lantern slides both in black and white and natural color, and motion pictures were prepared.

The Multilith machine continued to be an essential part of the photographic section. This machine prints on either paper or card stock up to $9\frac{1}{2}$x14 inches. Field manuals and forms for field use, subject to changes from time to time according to the developments of the work, made up the volume of work produced by this method. The printing of colored maps with

this machine has proven the best and most economical method of reproducing this type of informational material. The availability of the Multilith has proven to be particularly valuable on occasions when midseason changes in essential forms were necessary.

The black line printing machine came in for considerable use during the first full year of operation. On this machine it is possible to reproduce from cloth tracings all maps and drawings. The result is a reproduction to scale with black lines on white background. Since there is no shrinkage during the processing, exact reproductions can be turned out in any volume to meet the demands for field use. In cases where additional data are to be added to the original tracings and the original tracing is needed for future use, duplicate tracings are made on the machine. The volume of work produced with this machine during the year was doubled due to maps reproduced for the Pear Psylla Control project.

Color photography continued to be the major field work during the 1940 season using both a 16 mm. moving picture camera and a 6.5x9 cm. camera for still pictures required for lantern slides.

The scope of the moving picture field was expanded through the purchase of a micro attachment. This device permits subjects to be photographed one-half size, full size and twice the size of the original when supplemented with the lenses standardly used. The resulting magnification when projected on the screen shows added detail that has not been secured in the past.

Through experiments made during 1939 it was determined that a camera for taking color pictures to actual lantern slide size would be an important addition to the photographic equipment. A 6.5x9 cm. camera which takes pictures up to actual size of image was secured and has proven exceptionally satisfactory.

The amount of photographic, Multilith and black line printer work produced during 1940, including work for the Pear Psylla Control, is shown in the following table:

PHOTOGRAPHIC, MULTILITH AND BLACK LINE WORK

Item		Northwestern Region	Sugar Pine Region	Total
PHOTOGRAPHIC				
Lantern slides,	black & white	16		16
	natural color	138	32	170
Films, developed, field films		116	20	136
Copies	5x7	4		4
	8x10	172	67	239
Printing	4x5 or smaller	110	54	164
	5x7	1,527	315	1,842
	8x10	330	14	344
	9x11	3,007	4,108	7,115
Enlarging	11x14 or smaller	234	407	641
	16x20		124	124
	30x40	107		107
Movie film	50 ft. rolls	4		4
	100 ft. rolls	25	9	34
Total Items		5,790	5,150	10,940
MULTILITH				
Copies		33	20	53
Plates made		32	15	47
Cards printed		21,300		21,300
Cards printed, reverse		20,000		20,000
Total cards		41,300		41,300
Paper printed		103,000	5,500	108,500
Paper printed, reverse		30,500	4,000	34,500
Total paper		133,500	9,500	143,000
Total Items		174,865	9,535	184,400
BLACK LINE PRINTER				
Total maps printed		1,983	54	2,037
Grand total all items		182,638	14,739	197,377

B. Educational Section.

To comply with the demands for information and instruction on blister rust and its control, bulletins, posters, pictures, slides, and talks have been used. To this list was added a motion picture upon its completion in the spring of 1940. Through these features it has been possible to reach a large number of people including blister rust personnel in the Bureau, Forest Service, and State camps, timber owners or administrators, students in both the high schools and colleges, and many of the general public. The following set forth the scope of each of these features:

1. Bulletins, Posters and Specimens

The bulletins issued in 1940 are the same as those used in 1939. Of about 10 used, the Forest Service-Bureau publication "The War on White Pine Blister Rust in the Inland Empire" and Miscellaneous Publication No. 23, "Protect Western White Pine and Sugar Pine from Blister Rust", are of greatest value. During the year all bulletins issued from Spokane totaled about 1,500.

Use of the new poster, designed for the western regions, was confined mainly to blister rust control and CCC camps and the headquarters of various forest activities. Several of these along with the bulletins were used for a Camp Fire Girl Guardians' School camp. The total of posters issued during the year was about 150.

Preserved specimens in display cases and bulk specimens for classroom use were again distributed. Most notable of this material issued were 13 jars of leaves and cankers and 30 tubes of cankers sent to the University of California, and 7 jars of leaves and cankers supplied to the University of Idaho.

2. Talks, Slides and Motion Pictures

Talks, both with and without lantern slides, have been a major feature of the educational program during past years and to a limited extent were used in 1940. With the completion of a silent motion picture, though, this medium replaced the other form of presentation to a great extent. It is notable too that because this form of "talk" is more desired by the general public, more opportunities are offered for engagements. This proved to be the case for both the Bureau and Forest Service, the latter also using a copy of the film.

With the film available for use only during the last seven months of the year, many of the schools and other organizations could not be served with showings until after the field season and some not until 1941. In spite of this the season's total was 61 projections to 3,686 people for the Bureau copy of the film. No report is available on the use of the Forest Service copy, but it is known that the film was used extensively.

3. Fairs and Exhibits

This medium for education and information was not used directly by the Bureau during 1940. However, some of the material for a blister rust exhibit by the Forest Service at the Bonner County Fair in Sandpoint, Idaho, was provided.

4. General Publicity

Various news items on blister rust and the control work appeared in papers of the region during 1940. Although purely informational, many of these referred to the allotments for the work and the extent of employment involved. The latter pertains particularly to the WPA projects since this work is especially suitable for relief assignment.

A P P E N D I X

TABLE NO. 1

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
CALENDAR YEAR 1940, REGULAR APPROPRIATIONS

Project	January 1 to June 30, 1940			July 1 to December 31, 1940			Grand Total
	Salaries	Expense	Total	Salaries	Expense	Total	
3.2 Cooperative Ribes Eradication on Federal Lands							
3.21-2 - Cabinet National Forest, Montana	$ 675.00	$ 40.35	$ 715.35	$ 675.00	$ 51.11	$ 726.11	$ 1,441.46
3.21-3 - Kootenai National Forest, Montana	675.00	40.35	715.35	675.00	51.13	726.13	1,441.48
3.22 - Method Studies of Ribes Eradication, Idaho	1,450.16	4.24	1,454.40	1,299.96		1,299.96	2,754.36
3.3 Cooperative Ribes Eradication on National Parks							
3.31 - Glacier National Park, Montana	139.20	17.12	156.32	550.00	102.05	652.05	808.37
3.33-1 - Mt. Rainier National Park, Washington		89.09	89.09	550.00	1.60	551.60	640.69
3.4 Cooperative Ribes Eradication on State and Private Lands							
3.42-1 - Clearwater Operation, Idaho	3,623.86	162.09	3,785.95	3,000.00		3,000.00	6,785.95
3.42-2 - St. Joe Operation, Idaho	4,932.30		4,932.30	4,487.70		4,487.70	9,420.00
3.42-3 - Coeur d'Alene Operation, Idaho	1,350.00		1,350.00	1,350.00		1,350.00	2,700.00
3.42-4 - Kaniksu Operation, Idaho	3,000.00		3,000.00	1,900.00		1,900.00	4,900.00
3.42-5 - Mt. Spokane Operation, Idaho	825.00		825.00	550.00		550.00	1,375.00
3.43-2 - Mt. Spokane Operation, Washington	877.00		877.00				877.00
4.1 Field Studies, Spread of the Rust							
4.12 - Idaho	3,007.30		3,007.30	3,249.96		3,249.96	6,257.26
4.13 - Washington	25.20	10.00	35.20		10.00	10.00	45.20
4.16 - Wyoming					176.77	176.77	176.77
6. Educational Work	1,345.83	62.50	1,408.33	1,350.00	51.09	1,401.09	2,809.42
9. Maintenance of Field Office and Miscellaneous Expenses							
9.1 - Supervision	2,400.00	311.65	2,711.65	2,400.00	74.71	2,474.71	5,186.36
9.2 - Office Maintenance	9,218.11	18.18	9,236.29	10,579.80	19.60	10,599.40	19,835.69
9.4 - Miscellaneous Purchases Made in Washington, D.C.		2,124.49	2,124.49				2,124.49
Grand Total	$33,543.96	$2,880.06	$36,424.02	$32,617.42	$538.06	$33,155.48	$69,579.50

TABLE NO. 2

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JANUARY 1 - JUNE 30, 1940
201087-650999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
FEDERAL NON-CONSTRUCTION PROJECTS (TRANSFER FROM W.P.A.) 1940

Project	Salaries	Expense	Total
01-2-92-91, Idaho			
8.12 Field Studies, Pine Disease Survey	$ 948.26	$ 190.30	$ 1,138.56
8.22 Method Studies of Ribes Eradication		106.28	106.28
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	19,369.56	11,937.42	31,306.98
8.42-2 Cooperative Ribes Eradication, St. Joe Operation	20,885.90	13,262.06	34,147.96
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation		57.66	57.66
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation	14,811.23	4,729.07	19,540.30
8.42-5 Cooperative Ribes Eradication, Mt. Spokane Operation	5,842.60	2,374.44	8,217.04
8.6 Educational Work		1,384.14	1,384.14
8.9-1 Supervision		57.41	57.41
8.9-2 Spokane Office Maintenance		1,285.31	1,285.31
8.9-3 Miscellaneous Supplies and Services		1,124.69	1,124.69
Total 01-2-92-91 Idaho	61,857.55	36,508.78	98,366.33
01-2-93-102 Washington			
8.13 Field Studies, Pine Disease Survey	2,015.54		2,015.54
8.33-1 Cooperative Ribes Eradication, Mt. Rainier National Park		20.95	20.95
8.43-1 Cooperative Ribes Eradication, Kaniksu Operation	176.69		176.69
8.43-2 Cooperative Ribes Eradication, Mt. Spokane Operation	4,795.38	858.27	5,653.65
8.6 Educational Work	1,031.55	393.30	1,424.85
8.9-1 Supervision		4.64	4.64
8.9-2 Spokane Office Maintenance	4,628.42	215.51	4,843.93
8.9-3 Miscellaneous Supplies and Services	1,140.53	505.29	1,645.82
Total 01-2-93-102 Washington	13,788.11	1,997.96	15,786.07
Grand Total January 1 - June 30, 1940	$75,645.66	$38,506.74	$114,152.40

201088-650999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
ADMINISTRATIVE EXPENSES (TRANSFER FROM W.P.A.) 1940

Project	Salaries	Expense	Total
01-9-08-1 Washington			
8.6 Educational Work		9.97	9.97
8.9-2 Spokane Office Maintenance	2,425.69	1,157.61	3,583.30
8.9-3 Miscellaneous Supplies and Services		414.26	414.26
Total Administrative, 201088	$ 2,425.69	$ 1,581.84	$ 4,007.53

TABLE NO. 3

FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JULY 1 - DECEMBER 31, 1940
401087-651999 EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE
FEDERAL NON-CONSTRUCTION PROJECTS (TRANSFER FROM W.P.A.) 1941

Project	Salaries	Expense	Total
101-2-92-7, Idaho			
8.12 Field Studies, Pine Disease Survey	$ 451.87	$ 284.08	$ 735.95
8.22 Method Studies of Ribes Eradication		119.54	119.54
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	27,266.17	4,285.67	31,551.84
8.42-2 Cooperative Ribes Eradication, St. Joe Operation	30,062.00	6,323.44	36,385.44
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation		135.10	135.10
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation	39,965.20	2,957.85	42,923.05
8.42-5 Cooperative Ribes Eradication, Mt. Spokane Operation	14,179.13	2,147.44	16,326.57
8.6 Educational Work		156.84	156.84
8.9-1 Supervision		146.11	146.11
8.9-2 Spokane Office Maintenance	607.00	1,445.65	2,052.65
8.9-3 Miscellaneous Supplies and Services		199.40	199.40
Total 101-2-92-7, Idaho	112,531.37	18,201.12	130,732.49
101-2-93-17, Washington			
8.13 Field Studies, Pine Disease Survey	1,327.63	7.00	1,334.63
8.33-1 Cooperative Ribes Eradication, Mt. Rainier National Park		157.74	157.74
8.43-2 Cooperative Ribes Eradication, Mt. Spokane Operation	7,512.23	672.41	8,184.64
8.6 Educational Work	595.03		595.03
8.9-2 Spokane Office Maintenance	3,170.88	912.30	4,083.18
8.9-3 Miscellaneous Supplies and Services	1,039.48	471.86	1,511.34
Total 101-2-93-17, Washington	13,645.25	2,221.31	15,866.56
Grand Total July 1 - December 31, 1940	$126,176.62	$20,422.43	$146,599.05

401008-651999 EMERGENCY RELIEF, AGRICULTURE,
ADMINISTRATIVE EXPENSES (TRANSFER FROM W.P.A.) 1941

Project	Salaries	Expense	Total
101-9-00-1, Washington			
8.9-2 Spokane Office Maintenance	1,531.04		1,531.04
8.9-3 Miscellaneous Supplies and Services		23.28	23.28
Total Administrative, 401008	$ 1,531.04	$ 23.28	$ 1,554.32

TABLE NO. 4

*SUPPLEMENTAL REPORT OF FEDERAL EXPENDITURES, NORTHWESTERN DIVISION OF BLISTER RUST CONTROL
JULY 1, 1936 - JUNE 30, 1937
201085, EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE, FLOOD CONTROL AND OTHER CONSERVATION, 1936 - 1937

Project	Adjustments and Additions to 1936 and 1937 Annual Report Tables*		
	July 1, 1936 - December 31, 1936		January 1, 1937 - June 30, 1937
	Salary	Expense	Expense
201-5010, Idaho			
8.12 Field Studies, Pine Disease Survey			$ 1.61
8.42-1 Cooperative Ribes Eradication, Clearwater Operation	$ 5.13		254.36
8.42-2 Cooperative Ribes Eradication, St. Joe Operation			254.43
8.42-3 Cooperative Ribes Eradication, Coeur d'Alene Operation			28.54
8.42-4 Cooperative Ribes Eradication, Kaniksu Operation			148.48
8.9-3 Miscellaneous Supplies and Services			46.01
Total 201-5010, Idaho	5.13		733.43
201-5010, Washington			
8.9-3 Miscellaneous Supplies and Services		$2.51	
Total 201-5010, Washington		2.51	
201-5010, Wyoming			
8.46 Cooperative Ribes Eradication, Medicine Bow Operation	(-108.33)**		8.54
Total 201-5010, Wyoming	(-108.33)		8.54
Grand Total July 1, 1936 - June 30, 1937	$(-103.20)	$2.51	$741.97

*SUPPLEMENTAL REPORT FOR JULY 1, 1937 - JUNE 30, 1938
501082, EMERGENCY RELIEF, AGRICULTURE, ENTOMOLOGY AND PLANT QUARANTINE PUBLIC BUILDINGS, PARKS, UTILITIES, FLOOD CONTROL, ETC., 1938

	January 1, 1938 - June 30, 1938
	Expense
501-2-108, Idaho	
8.9-3 Miscellaneous Supplies and Services	$1.76
Total 501-2-108, Idaho	1.76
Grand Total July 1, 1937 - June 30, 1938	$1.76

* These supplemental items cover vouchers paid at irregular intervals subsequent to annual reports submitted for these periods. Expenses consist entirely of Government bill of lading freight charges on equipment and supplies.

** To adjust salary over reported on 1936 report.

TABLE NO. 5

SUMMARY OF EXPENDITURES FROM STATE AND PRIVATE FUNDS
1928 - 1940 IDAHO

Year	State	Private	Total
1928	$ 2,518.55	$ 2,264.32	$ 4,782.87
1929		19,027.66	19,027.66
1930		20,000.00	20,000.00
1931	5,000.00	35,905.32	40,905.32
1932	8,003.43	11,186.33	19,189.76
1933			
1934	29,154.06		29,154.06
1935	15,000.00		15,000.00
1936	16,998.25		16,998.25
1937	15,001.25		15,001.25
1938	15,000.44		15,000.44
1939	15,438.04		15,438.04
1940	10,034.48		10,034.48
Total	$132,148.50	$88,383.63	$220,532.13

TABLE NO. 6

SUMMARY OF FEDERAL EXPENDITURES BY ACTIVITIES, NORTHWESTERN REGION
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
1940

State	Appropriation	Total Expenditures	Activity						
			Ribes Eradication	Methods Development	Pre-Eradication	Disease Survey	Education and Information	Office and Miscellaneous	Supervision
Idaho	Regular	$ 53,778.34	$ 20,005.76	$2,754.36	$405.00	$ 6,257.26	$1,809.42	$18,260.18	$4,286.36
	ERA	233,982.82	217,768.63	225.82		1,874.51	1,540.98	12,572.88	
	Total	287,761.16	237,774.39	2,980.18	405.00	8,131.77	3,350.40	30,833.06	4,286.36
Montana	Regular	6,239.39	3,739.39				500.00	1,700.00	300.00
Washington	Regular	8,885.00	5,739.80			45.20	500.00	2,000.00	600.00
	ERA	32,330.48	13,835.37			3,350.17	2,029.85	13,115.09	
	Total	41,215.48	19,575.17			3,395.37	2,529.85	15,115.09	600.00
Subtotal Western White Pine Region	Regular	68,902.73	29,484.95	2,754.36	405.00	6,302.46	2,809.42	21,960.18	5,186.36
	ERA	266,313.30	231,604.00	225.82		5,224.68	3,570.83	25,687.97	
	Total	335,216.03	261,088.95	2,980.18	405.00	11,527.14	6,380.25	47,648.15	5,186.36
Wyoming	Regular	676.77				676.77			
	ERA								
	Total	676.77				676.77			
Total Northwestern Region	Regular	69,579.50	29,484.95	2,754.36	405.00	6,979.23	2,809.42	21,960.18	5,186.36
	ERA	266,313.30	231,604.00	225.82		5,224.68	3,570.83	25,687.97	
	Total	$335,892.80	$261,088.95	$2,980.18	$405.00	$12,203.91	$6,380.24	$47,648.15	$5,186.36

TABLE NO. 7

SUMMARY OF FEDERAL EXPENDITURES, NORTHWESTERN REGION OF BLISTER RUST CONTROL
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
1922 - 1940

State	Appropriation	Total	Ribes Eradication	Methods Development	Chemical Investigation	Reconnaissance and Preeradication	Ecology	Disease Survey and Scouting	Damage Studies	Education and Information	Quarantine Enforcement	Cultivated Black Currant Eradication	Nursery Sanitation	Office and Miscellaneous	Supervision
Idaho	Regular	$1,165,160.60	$ 607,230.11	$ 95,424.30	$ 64,575.98	$54,438.32	$45,103.42	$ 29,986.64	$25,679.88	$33,824.52	$10,758.86	$ 28,173.15		$132,010.71	$37,954.71
	NIRA	470,841.62	423,058.33	4,662.40	3,441.74		3,293.09			6,366.50				28,083.64	1,935.92
	ERA	2,900,763.68	2,791,029.15	2,183.38	937.99			33,569.03		4,635.80	1,456.86			65,432.28	1,519.19
	Total	4,536,765.90	3,821,317.59	102,270.08	68,955.71	54,438.32	48,396.51	63,555.67	25,679.88	44,826.82	12,215.72	28,173.15		225,526.63	41,409.82
Montana	Regular	191,953.09	28,906.69	11,949.39	15,809.93	12,400.17	2,533.00	13,928.33	7,517.94	10,263.40	9,781.81	22,010.30	$15,160.41	31,036.42	10,653.30
	NIRA	88,306.79	80,458.56		258.00	902.74				2,689.14			148.36	3,287.99	562.00
	ERA	196,847.11	193,848.78					219.31		32.72				2,730.30	16.00
	Total	477,106.99	303,214.03	11,949.39	16,067.93	13,302.91	2,533.00	14,147.64	7,517.94	12,985.26	9,781.81	22,010.30	15,308.77	37,056.71	11,231.30
Washington	Regular	211,869.75	21,712.62	815.00	12,837.91	4,770.40	2,425.10	21,033.39	8,150.83	7,023.13	18,957.24	63,838.81	2,273.74	32,154.05	15,877.53
	NIRA	105,199.60	92,044.82		274.01					3,170.46				9,148.31	562.00
	ERA	437,039.29	267,672.77	78.06	41.74	307.37		8,609.73		13,987.97				146,193.50	148.15
	Total	754,108.64	381,430.21	893.06	13,153.66	5,077.77	2,425.10	29,643.12	8,150.83	24,131.56	18,957.24	63,838.81	2,273.74	187,495.86	16,587.68
Total Western White Pine Region	Regular	1,568,983.44	657,849.42	108,188.69	93,223.82	71,608.89	50,061.52	64,948.36	41,348.65	51,111.05	39,497.91	114,022.26	17,434.15	195,203.18	64,485.54
	NIRA	664,348.01	595,561.71	4,662.40	3,973.75	902.74	3,293.09			12,226.10			148.36	40,519.94	3,059.92
	ERA	3,534,650.08	3,252,550.70	2,261.44	979.73	307.37		42,398.07		18,656.49	1,456.86			214,356.08	1,683.34
	Total	5,767,981.53	4,505,961.83	115,112.53	98,177.30	72,819.00	53,354.61	107,346.43	41,348.65	81,993.64	40,954.77	114,022.26	17,582.51	450,079.20	69,228.80
Colorado	Regular	11,852.04	5,509.48		700.00			611.65		1,226.64	136.68			2,606.40	1,061.19
	NIRA	8,041.45		823.28	52.00	6,422.74				100.00				520.43	123.00
	ERA	59,396.51	54,444.49		124.11	15.11				511.99				4,175.81	125.00
	Total	79,290.00	59,953.97	823.28	876.11	6,437.85		611.65		1,838.63	136.68			7,302.64	1,309.19
Wyoming	Regular	10,480.59	4,318.27		700.00	598.64		890.88		359.84	47.85			2,567.14	997.97
	NIRA	7,107.41			191.42	5,641.49				100.00				1,051.50	123.00
	ERA	58,283.96	54,151.34			30.60				193.22				3,734.87	173.93
	Total	75,871.96	58,469.61		891.42	6,270.73		890.88		653.06	47.85			7,353.51	1,294.90
Total Central Rocky Mountain Region	Regular	22,332.63	9,827.75		1,400.00	598.64		1,502.53		1,586.48	184.53			5,173.54	2,059.16
	NIRA	15,148.86		823.28	243.42	12,064.23				200.00				1,571.93	246.00
	ERA	117,680.47	108,595.83		124.11	45.71				705.21				7,910.68	298.93
	Total	155,161.96	118,423.58	823.28	1,767.53	12,708.58		1,502.53		2,491.69	184.53			14,656.15	2,604.09
Total Northwestern Region	Regular	1,591,316.07	667,677.17	108,188.69	94,623.82	72,207.53	50,061.52	66,450.89	41,348.65	52,697.53	39,682.44	114,022.26	17,434.15	200,376.72	66,544.70
	NIRA	679,496.87	595,561.71	5,485.68	4,217.17	12,966.97	3,293.09			12,426.10			148.36	42,091.87	3,305.92
	ERA	3,652,330.55	3,361,146.53	2,261.44	1,103.84	353.08		42,398.07		19,361.70	1,456.86			222,266.76	1,982.27
	Total	$5,923,143.49	$4,624,385.41	$115,935.81	$99,944.83	$85,527.58	$53,354.61	$108,848.96	$41,348.65	$84,485.33	$41,139.30	$114,022.26	$17,582.51	$464,735.35	$71,832.89

TABLE NO. 1

SUMMARY OF 1940 RIBES ERADICATION

Stete	Initiel Eradicetion Work				Reeredicetion Work				Totals				Per Cent Initial Eradicetion Worked**
	Acreage Worked	Number Ribes Destroyed		Number* 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Men Days	
		Wild	Cultiveted			Wild	Cultivated			Wild	Cultiveted		
Ideho	19,138	4,870,959	-	27,876	71,855	10,104,906	-	92,085	90,993	14,975,865	-	119,961	0.9
Montena	11,002	978,915	-	9,803	2,155	159,186	-	2,181	13,157	1,138,101	-	11,984	5.6
Washington	6,468	2,593,261	-	5,703	6,980	1,126,912	-	6,501	13,448	3,720,173	-	12,204	3.8
Total	36,608	8,443,135	-	43,382	80,990	11,391,004	-	100,767	117,598	19,834,139	-	144,149	1.5#

* Number 8-hour men deys = houre worked per dey x number men / 8

** Percentege of totel white pine control ecreege in stete that was worked during 1940.

\# 1.5 is besed on control eree for Inland Empire put on besis of ell stetee (Wyoming and Colorado) the percentege figure would be 1.2.

Stete	Ribes Per Acre		Men Days Per Acre		Number of Camps				Number of Employees*					
	Initiel Eradication	Reeradicetion	Initiel Eradicetion	Reeredicetion	C.C.C.	W.P.A.	Reguler	Total	Laborers				All Supervision	Total Employees
									C.C.C.	W.P.A.	Regular	Totel		
Ideho	255	141	1.46	1.28	14	15	28	57	1,133	1,066	927	3,126	205	3,331
Montene	89	74	.89	1.01	5	4	3	12	198	185	85	468	29	497
Weshington	401	161	.88	.93	4	1	3	8	164	58	99	321	22	343
Totel	231	141	1.19	1.24	23	20	34	77	1,495	1,309	1,111	3,915	256	4,171

* Maximum number of persons on the pay roll et the peek of the seeson. Total number persons employed is not used because the large turnover in W.P.A. camps would reeult in an exeggerated figure.

TABLE NO. 1A

SUMMARY OF ALL RIBES ERADICATION 1918-1940 (INCLUSIVE)

Stete a	Totel Acreege White Pine b	Acreege White Pine Worth Protection c	Acreage Control Areas (White Pine and Protective Zones) d	Acreege Reported Initielly Worked e	Initiel Eradicetion Work			
					Net Acreege Worked in Control Areas f	Number Ribes Destroyed		Number 8-Hour Man Deys i
						Wild g	Cultiveted h	
Colorado	550,000*	206,000*	206,000*	14,859	14,859	410,649	-	6,292
Ideho	2,307,655	2,307,655	2,153,741	1,620,859	1,620,859	316,533,141	-	1,294,288
Montene	220,740	220,740	194,544	123,281	123,281	16,011,047	-	85,404
Weshington	169,349	169,349	169,349	119,162	119,162	27,276,872	-	101,176
Wyoming	3,754,000*	304,000*	247,900*	21,760	21,760	1,085,771	-	6,940
Totel	7,001,744	3,207,744	2,971,534	1,899,921	1,899,921	361,317,480	-	1,494,100

*Incomplete

Stete a	Reeredicetion				Totele				Percent Initiel Eredicetion Worked*	Per Acre			
	Acreege Worked b	Number Ribes Destroyed		Number 8-Hour Man Deys e	Net Acreege Worked in Control Areee f	Number Ribes Destroyed		Number 8-Hour Men Deys i		Ribes		Men Days	
		Wild c	Cultiveted d			Wild g	Cultiveted h			Initiel Eredicetion	Re-eredicetion	Initiel Eredicetion	Re-eredication
Coloredo	1,962	86,886	-	664	16,821	497,535	-	6,956	7.2	28	44	.42	.34
Ideho	319,263	49,574,968	-	345,632	1,940,122	366,108,109	-	1,639,920	75.3	195	155	.80	1.08
Montane	8,113	1,114,881	-	10,270	131,394	17,125,928	-	95,674	63.4	130	137	.69	1.26
Weshington	29,233	4,751,004	-	28,429	148,395	32,027,876	-	129,605	70.4	229	162	.85	.97
Wyoming	-	-	-	-	21,760	1,085,771	-	6,940	8.8	50	-	.31	-
Total	358,571	55,527,739	-	384,995	2,258,492	416,845,219	-	1,879,095	63.9	190	155	.79	1.07

*Percentege of totel white pine control eree in Stete that hes been worked initielly.

TABLE NO. 2

SUMMARY OF 1940 RIBES ERADICATION BY PROGRAMS
(Including All Work - Initial and Reeradication)

State	Total Acreage Worked (Initial and Reeradication)	Regular and Cooperative: Acreage Worked	Regular and Cooperative: Number Ribes Destroyed: Wild	Regular and Cooperative: Number Ribes Destroyed: Cultivated	Regular and Cooperative: Number 8-Hour Man Days	W.P.A. and E.R.A.: Acreage Worked	W.P.A. and E.R.A.: Number Ribes Destroyed: Wild	W.P.A. and E.R.A.: Number Ribes Destroyed: Cultivated	W.P.A. and E.R.A.: Number 8-Hour Man Days
Idaho	90,993	42,470	6,386,998	-	47,159	34,995	6,811,647	-	43,808
Montana	13,157	4,516	428,573	-	4,224	5,000	482,417	-	5,006
Washington	13,448	9,170	3,193,411	-	6,910	3,022	357,666	-	2,733
Total	117,598	56,156	10,008,982	-	58,293	43,017	7,651,730	-	51,547

State	E.C.W. and S.C.S.: Acreage Worked	E.C.W. and S.C.S.: Number Ribes Destroyed: Wild	E.C.W. and S.C.S.: Number Ribes Destroyed: Cultivated	E.C.W. and S.C.S.: Number 8-Hour Man Days	Totals: Acreage Worked	Totals: Number Ribes Destroyed: Wild	Totals: Number Ribes Destroyed: Cultivated	Totals: Number 8-Hour Man Days
Idaho	13,528	1,777,220	-	28,994	90,993	14,975,865	-	119,961
Montana	3,641	227,111	-	2,754	13,157	1,138,101	-	11,984
Washington	1,256	169,096	-	2,561	13,448	3,720,173	-	12,204
Total	18,425	2,173,427	-	34,309	117,598	19,834,139	-	144,149

TABLE NO. 2A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1940 (INCLUSIVE)
(Initial and Reeradication)

State	Total* Acreage Reported Worked (Initial and Reeradication)	Regular and Cooperative: Acreage Worked	Regular and Cooperative: Number Ribes Destroyed: Wild	Regular and Cooperative: Number Ribes Destroyed: Cultivated	Regular and Cooperative: Number 8-Hour Man Days	W.P.A and E.R.A.: Acreage Worked	W.P.A and E.R.A.: Number Ribes Destroyed: Wild	W.P.A and E.R.A.: Number Ribes Destroyed: Cultivated	W.P.A and E.R.A.: Number 8-Hour Man Days
Colorado	16,821	-	-	-	-	16,821	497,535	-	6,956
Idaho	1,940,122	505,098	89,982,920	-	371,487	495,319	90,629,477	-	404,791
Montana	131,394	13,530	2,436,552	-	16,164	57,243	6,208,989	-	41,067
Washington	148,395	15,108	5,608,209	-	16,196	38,891	13,462,963	-	51,997
Wyoming	21,760	-	-	-	-	21,760	1,085,771	-	6,940
Total	2,258,492	533,736	98,027,681	-	403,847	630,034	111,884,735	-	511,751

*This column = column e, Table 1A, Sheet 1, plus column and Table 1A Sheet 2.

State	E.C.W. and S.C.S.: Acreage Worked	E.C.W. and S.C.S.: Number Ribes Destroyed: Wild	E.C.W. and S.C.S.: Number Ribes Destroyed: Cultivated	E.C.W. and S.C.S.: Number 8-Hour Man Days	P.W.A. or N.R.A.: Acreage Worked	P.W.A. or N.R.A.: Number Ribes Destroyed: Wild	P.W.A. or N.R.A.: Number Ribes Destroyed: Cultivated	P.W.A. or N.R.A.: Number 8-Hour Man Days	Total Emergency Program (W.P.A.-E.C.W.-P.W.A.): Acreage Worked	Total Emergency Program: Number Ribes Destroyed: Wild	Total Emergency Program: Number Ribes Destroyed: Cultivated	Total Emergency Program: Number 8-Hour Man Days
Colorado	-	-	-	-	-	-	-	-	16,821	497,535	-	6,956
Idaho	587,864	123,253,440	-	655,192	351,841	62,242,272	-	208,450	1,435,024	276,125,189	-	1,268,433
Montana	16,633	1,638,078	-	13,627	43,988	6,842,309	-	24,816	117,864	14,689,376	-	79,510
Washington	33,246	4,749,950	-	36,993	61,150	8,206,754	-	24,419	133,287	26,419,667	-	113,409
Wyoming	-	-	-	-	-	-	-	-	21,760	1,085,771	-	6,940
Total	637,743	129,641,468	-	705,812	456,979	77,291,335	-	257,685	1,724,756	318,817,538	-	1,475,248

TABLE NO. 3

SUMMARY OF ALL OTHER CONTROL WORK FOR 1940

State	Cultivatad Black Currant Eradication				Nursary Sanitation						Preeradication Survey	
	Numbar Inspactions Made	Number Locations Found	Numbar Black Currants Destroyed	Number 8-Hour Man Days	Number Nursaries Worked	Number Whita Pines in Nurseries	Number Acres Worked	Number Ribea Destroyad Wild	Cultivated	Number 8-Hour Man Days	Number Acres Mapped Whita Pine and Protection Zones	Number 8-Hour Man Days
Idaho	-	-	-	-	-	-	-	-	-	-	17,530	270
Montana	-	-	-	-	1	15,000,000	171	6,108	-	87	-	-
Total	-	-	-	-	1	15,000,000	171	6,108	-	87	17,530	270

State	Treatment Infected Trees					Checking Advance		Post		Regular	
	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days	Acreaga Checked	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days
Idaho	40,196	23,919	8,484	-	254	-	-	-	-	-	-
Montana	8,466	8,150	316	-	195	-	-	-	-	-	-
Total	48,662	32,069	8,800	-	449	-	-	-	-	-	-

TABLE NO. 3A

SUMMARY OF ALL OTHER CONTROL WORK 1918-1940 (INCLUSIVE)

State	Cultivated Black Currant Eradication				Nursery Sanitation: Number of Nurseries		Number Acres Worked			Number Ribes Destroyed		
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man Days	Sanitation Zone Maintained	Sanitation Zone Abandoned	Nurseries Maintaining Zones	Nurseries Which Abandoned Zones	Total Acreage	Wild	Cultivated	Number 8-Hour Man Days
Colorado	-	-	-	-	-	-	-	-	-	-	-	-
Idaho	5,233	2,471	16,553	2,341	-	-	-	-	-	-	-	-
Montana	1,311	798	5,080	514	1	-	8,357	-	8,357	1,336,981	-	6,753
Washington	50,050	5,378	78,226	4,218	1	-	378	-	378	20,275	-	640
Wyoming	-	-	-	-	1	-	2,038	-	2,038	73,786	-	567
Total	56,594	8,647	99,859	7,073	3	-	10,773	-	10,773	1,431,042	-	7,960

State	Preeradication Survey		Treatment Infected White Pine				
	Number Acres Mapped White Pina and Protection Zones	Number 8-Hour Man Days	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days
Colorado	206,000	290	-	-	-	-	-
Idaho	3,269,860	4,125	40,196	23,919	8,484	-	254
Montana	259,675	798	8,466	8,150	316	-	195
Washington	146,541	342	-	-	-	-	-
Wyoming	317,900	329	-	-	-	-	-
Total	4,199,976	5,884	48,662	32,069	8,800	-	449

TABLE NO. 4

SUMMARY OF EXPENDITURES FOR 1940

State	Total			Recapitulation of Federal Funds						
				Regular Funds			Emergency Funds			
	Federal (All Agencies Including "State W.P.A. projects")	State (Including All Cooperative Funds)	Grand Total	Bureau of Entomology and Plant Quarantine	Forest Service	Department of Interior*	Federal W.P.A. and N.Y.A.	State W.P.A.	E.C.W. and S.C.S.	Total Emergency Funds
Idaho	$717,084.77	$10,034.48	$727,119.25	$53,778.34	$336,918.22	-	$282,897.21	-	$43,491.00	$326,388.21
Montana	86,905.90	-	86,905.90	6,239.39	47,727.74	-	28,807.77	-	4,131.00	32,938.77
Washington	97,448.41	-	97,448.41	8,885.00	52,391.43	-	32,330.48	-	3,841.50	36,171.98
Wyoming	676.77	-	676.77	676.77	-	-	-	-	-	-
Total	$902,115.85	$10,034.48	$912,150.33	$69,579.50	$437,037.39	-	$344,035.46	-	$51,463.50	$395,498.96

*Including National Parks, Indian Reservations and O and C.

State	Recapitulation By Activities (Federal and State)						
	Supervision Including State and District Leaders	Ribes Eradication	Cultivated Black Currant Eradication	Nursery Sanitation	Canker Elimination	Preeradication Survey	All Other (Checking, Field Data and Miscellaneous)
Idaho	$41,233.54	$635,543.45	-	-	$1,250.00	$1,592.00	$47,500.26
Montana	7,300.00	76,982.90	-	$130.50	292.50	-	2,200.00
Washington	5,727.00	70,681.10	-	-	-	-	21,040.31
Wyoming	-	-	-	-	-	-	676.77
Total	$54,260.54	$783,207.45	-	$130.50	$1,542.50	$1,592.00	$71,417.34

TABLE 4A

SUMMARY OF ALL EXPENDITURES 1918-1940 (INCLUSIVE)

State	Federal (All Agencies Including State WPA Projects)	State (Including All Cooperative Funds)	Grand Total	Recapitulation By Programs					
				Regular	Emergency				
				Federal And State Coop.	FED.,W.P.A., C.W.A.,ERA., N.Y.A.	State W.P.A.	E.C.W. S.C.S.	P.W.A.	Total Emergency Programs
Colorado	$ 79,290.00	-	$ 79,290.00	$ 11,852.04	$ 59,396.51	-	-	$ 8,041.45	$ 67,437.96
Idaho	9,444,546.29	$220,532.13	9,665,078.42	3,520,345.77	3,321,918.87	-	$ 982,788.00	1,840,025.78	6,144,732.65
Montana	919,970.37	-	919,970.37	333,087.45	328,277.57	-	20,440.50	238,164.85	586,882.92
Washington	1,065,690.73	-	1,065,690.73	333,641.66	437,039.29	-	55,489.50	239,520.28	732,049.07
Wyoming	75,871.96	-	75,871.96	10,480.59	58,283.96	-	-	7,107.41	65,391.37
Total	$11,585,369.35	$220,532.13	$11,805,901.48	$4,209,407.51	$4,204,916.20	-	$1,058,718.00	$2,332,859.77	$7,596,493.97

State	Recapitulation By Activities (Federal and State)						
	Supervision (Including State and District Leaders)	Ribes Eradication	Cultivated Black Currant Eradication	Nursery Sanitation	Canker Elimination	Preeradication Survey	All Other (Checking, Field Data and Miscellaneous)
Colorado	$ 12,826.89	$ 49,302.91	-	-	-	$ 6,437.85	$ 10,722.35
Idaho	437,663.59	8,539,974.86	$ 28,173.15	-	$1,250.00	61,931.26	596,085.56
Montana	52,753.41	702,928.13	22,010.30	$16,719.27	292.50	13,302.91	111,963.85
Washington	42,128.13	667,320.19	63,838.81	2,273.74	-	5,077.77	285,052.09
Wyoming	11,461.74	46,834.40	-	-	-	6,270.73	11,305.09
Total	$556,833.76	$10,006,360.49	$114,022.26	$18,993.01	$1,542.50	$93,020.52	$1,015,128.94

TABLE NO. 4B

STATUS OF BLISTER RUST CONTROL 1918-1940 (INCLUSIVE)

State	Control Area Including Border Zones (Acres)	Net Control Area Initially Protected (Acres)	Control Areas Reworked Subsequent to Initial Protection (Acres)	Number 8-Hour Man Days (Man Days)	Ribes Destroyed (Wild and Cultivated) (Number)	Remaining Control Area Needing Initial Protection (Acres)	Estimated Protected Area Now on Maintenance Basis* (Acres)
Colorado	206,000	14,859	1,962	6,956	497,535	191,141	8,000
Idaho	2,153,741	1,620,859	319,263	1,639,920	366,108,109	532,882	661,830
Montana	194,544	123,281	8,113	95,674	17,125,928	71,263	63,183
Washington	169,349	119,162	29,233	129,605	32,027,876	50,187	46,729
Wyoming	247,900	21,760	-	6,940	1,085,771	226,140	9,000
Total	2,971,534	1,899,921	358,571	1,879,095	416,845,219	1,071,613	788,742

*Maintenance - Any portion of a control area that has through artificial (eradication of ribes) or natural treatment (shading out of ribes) acquired a status wherein the scarcity of ribes assures effective blister rust control for an indefinite period, such that no further work (except perhaps scouting) is expected to be needed during the current forest cycle. This status continues for a varying number of years until, after a major ecological change, a renewed increase and growth of ribes again endangers the pine, and these areas then revert to a rework status.

TABLE NO. 5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP - 1940

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acres	Ribes	Man Days	Acres	Ribes	Man Days
National Forests	22,393	5,500,585	26,671	44,513	5,533,018	56,879	66,906	11,033,603	83,550
O and C Revested Lands	-	-	-	-	-	-	-	-	-
Other Public Domain	170	32,197	208	529	73,860	680	699	106,057	888
National Parks	1,533	157,249	1,699	457	55,631	1,285	1,990	212,880	2,984
Indian Reservations	-	-	-	-	-	-	-	-	-
Subtotal Federal	24,096	5,690,031	28,578	45,499	5,662,509	58,844	69,595	11,352,540	87,422
State and Private	12,512	2,753,104	14,804	35,491	5,728,495	41,923	48,003	8,481,599	56,727
Grand Total	36,608	8,443,135	43,382	80,990	11,391,004	100,767	117,598	19,834,139	144,149

NATIONAL PARKS

	Initial Work			Reeradication Work			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
Glacier	1,533	157,249	1,699	-	-	-	1,533	157,249	1,699
Mount Rainier	-	-	-	457	55,631	1,285	457	55,631	1,285
Total	1,533	157,249	1,699	457	55,631	1,285	1,990	212,880	2,984
NATIONAL FORESTS									
Clearwater	1,563	-	-	4,353	-	-	5,916	-	-
St. Joe	1,297	-	-	19,139	-	-	20,436	-	-
*Coeur d'Alene	3,363	-	-	10,830	-	-	14,193	-	-
Kaniksu	8,297	-	-	8,508	-	-	16,805	-	-
Cabinet and Kootenai	2,293	-	-	1,683	-	-	3,976	-	-
Kootenai	5,580	-	-	-	-	-	5,580	-	-
Total	22,393	-	-	44,513	-	-	66,906	-	-
STATE AND PRIVATE LANDS									
Idaho	9,186	1,920,915	11,912	30,622	5,047,967	37,755	39,808	6,968,882	49,667
Montana	1,596	138,492	1,366	472	34,866	478	2,068	173,358	1,844
Washington	1,730	693,697	1,526	4,397	645,662	3,690	6,127	1,339,359	5,216
Total	12,512	2,753,104	14,804	35,591	5,728,495	41,923	48,003	8,481,599	56,727

*Includes National Forest land in Mount Spokane unit.

4

TABLE NO. 5A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS 1918-1940 (INCLUSIVE)

Land Ownership a	Total Acreage of White Pine Worth Protection b	Control Araas: Total Acreage* (White Pine and Protective Zones) c	Control Araas: Acraage Not Yet Worked Initially d	Initial Eradication: Nat Acreaga Worked a	Initial Eradication: Numbar Ribes Destroyad f	Initial Eradication: Number 8-Hour Man Days g
National Forests R-1	1,385,505	1,341,547	332,201	1,009,346	211,427,908	905,213
National Forests R-2 and 4	421,000**	421,000**	384,381	36,619	1,496,420	13,232
Subtotel	1,806,505	1,762,547	716,582	1,045,965	212,924,328	918,445
Other Public Domain	31,905	30,865	14,068	16,797	2,807,572	10,896
Nationel Parks	106,254**	40,154**	29,327	10,827	1,961,332	12,852
Indian Reservations (Shoshona)	11,000**	11,000**	11,000	-	-	-
Subtotal Federal	1,955,664	1,844,566	770,977	1,073,589	217,693,232	942,193
State and Privata	1,252,080	1,126,968	300,636	826,332	143,624,248	551,907
Grand Total	3,207,744	2,971,534	1,071,613	1,899,921	361,317,480	1,494,100

*Column d + column a equals column c the total of column e of this table should agree with tha total of column f of Tabla 1A.
**Indefinite

Land Ownership	Reeradication Work: Acreage Worked	Reeradication Work: Number Ribes Destroyed	Reeradication Work: Numbar 8-Hour Man Days	Totals (Initial and Rework): Acreage Worked	Totals (Initial and Rework): Number Ribas Destroyed	Totals (Initial and Rework): Number 8-Hour Man Days
National Forests R-1	188,402	25,954,861	218,299	1,197,748	237,382,769	1,123,512
National Forests R-2 and 4	1,962	86,886	664	38,581	1,583,306	13,896
Subtotal	190,364	26,041,747	218,963	1,236,329	238,966,075	1,137,408
Other Public Domain	5,194	760,383	5,827	21,991	3,567,955	16,723
National Parks	5,349	412,036	6,096	16,176	2,373,368	18,948
Indian Resarvations	-	-	-	-	-	-
Subtotal Federal	200,907	27,214,166	230,886	1,274,496	244,907,398	1,173,079
State and Privete	157,664	28,313,573	154,109	983,996	171,937,821	706,016
Grend Total	358,571	55,527,739	384,995	2,258,492	416,845,219	1,879,095

SUMMARY OF RIBES ERADICATION ON NATIONAL PARKS 1918-1940 (INCLUSIVE)

National Parks (List Separately) a	Total Acreage of White Pina Worth Protection b	Control Araas: Total Acreage* (White Pina end Protective Zones) c	Control Araas: Acreage Not Yet Worked Initially d	Initiel Eradication: Acreage Worked a	Initiel Eradication: Number Ribes Destroyed f	Initiel Eradication: Number 8-Hour Man Days g
Mt. Rainiar	8,254	8,254	-	8,254	1,640,507	10,070
Glacier	20,000	10,000	7,427	2,573	320,825	2,782
Yellowstone	69,000	12,900	12,900	-	-	-
Grand Teton	2,000	2,000	2,000	-	-	-
Rocky Mountain	7,000	7,000	7,000	-	-	-
Total National Perks	106,254	40,154	29,327	10,827	1,961,332	12,852

*Column d + column e = column c.

National Parks (List Seperately)	Reeradication Work: Acraage Worked	Reeradication Work: Number Ribes Destroyed	Reeradication Work: Number 8-Hour Men Days	Totals (Initial end Rework): Acreage Worked	Totals (Initial end Rework): Number Ribes Destroyed	Totals (Initial end Rework): Number 8-Hour Man Days
Mt. Rainier	5,349	412,036	6,096	13,603	2,052,543	16,166
Glacier	-	-	-	2,573	320,825	2,782
Total National Parks	5,349	412,036	6,096	16,176	2,373,368	18,948

TABLE NO. 5A (Continued)

SUMMARY OF RIBES ERADICATION ON NATIONAL FORESTS 1918-1940 (INCLUSIVE)

National Forests (List Separately) a	Total Acreage of White Pine b	Control Areas: Total Acreage (White Pine and Protective Zones)* c	Control Areas: Acreage Not Yet Worked Initially d	Initial Eradication: Acreage Worked e	Initial Eradication: Number Ribes Destroyed f	Initial Eradication: Number 8-Hour Man Days g
Clearwater	204,730	195,870	47,776	148,094	-	-
St. Joe	312,080	300,991	89,291	211,700	-	-
Coeur d' Alene**	358,395	348,092	37,803	310,289	-	-
Kaniksu	346,775	346,775	107,518	239,257	-	-
Cabinet	76,630	74,318	21,093	53,225	-	-
Kootenai	86,895	75,501	28,720	46,781	-	-
Subtotal Region One	1,385,505	1,341,547	332,201	1,009,346	211,427,908	905,213
Region Two	394,000	394,000	357,381	36,619	1,496,420	13,232
Region Four	27,000	27,000	27,000	-	-	-
Total	1,806,505	1,762,547	716,582	1,045,965	212,924,328	918,445

*Column d and column e = column c.
**Includes national forest land in Mount Spokane unit.

National Forests (List Separately)	Reeradication Work: Acreage Worked	Reeradication Work: Number Ribes Destroyed	Reeradication Work: Number 8-Hour Man Days	Totals (Initial and Rework): Acreage Worked	Totals (Initial and Rework): Number Ribes Destroyed	Totals (Initial and Rework): Number 8-Hour Man Days
Clearwater	46,973	-	-	195,067	-	-
St. Joe	60,793	-	-	272,493	-	-
Coeur d'Alene*	47,859	-	-	358,148	-	-
Kaniksu	27,698	-	-	266,955	-	-
Cabinet	3,914	-	-	57,139	-	-
Kootenai	1,165	-	-	47,946	-	-
Subtotal Region One	188,402	25,954,861	218,299	1,197,748	237,382,769	1,123,512
Region Two	1,962	86,886	664	38,581	1,583,306	13,896
Region Four	-	-	-	-	-	-
Total	190,364	26,041,747	218,963	1,236,329	238,966,075	1,137,408

*Includes national forest land in Mount Spokane unit.

SUMMARY OF RIBES ERADICATION ON STATE AND PRIVATE LANDS 1918-1940 (INCLUSIVE)

State and Private Lands (List by States) a	Total Acreage of White Pine b	Control Areas: Total Acreage* (White Pine and Protective Zones) c	Control Areas: Acreage Not Yet Worked Initially d	Initial Eradication: Acreage Worked e	Initial Eradication: Number Ribes Destroyed f	Initial Eradication: Number 8-Hour Man Days g
Idaho	1,145,975	1,023,353	271,653	751,700	125,478,796	486,777
Montana	37,215	34,725	14,023	20,702	2,690,948	14,170
Washington	68,890	68,890	14,960	53,930	15,454,504	50,960
Total	1,252,080	1,126,968	300,636	826,332	143,624,248	551,907

*Column c = column d and column e.

State and Private Lands (List by States)	Reeradication Work: Acreage Worked	Reeradication Work: Number Ribes Destroyed	Reeradication Work: Number 8-Hour Man Days	Totals (Initial and Rework): Acreage Worked	Totals (Initial and Rework): Number Ribes Destroyed	Totals (Initial and Rework): Number 8-Hour Man Days
Idaho	137,254	24,417,534	133,533	888,954	149,896,330	620,310
Montana	3,034	416,929	3,841	23,736	3,107,877	18,011
Washington	17,376	3,479,110	16,735	71,306	18,933,614	67,695
Total	157,664	28,313,573	154,109	983,996	171,937,821	706,016

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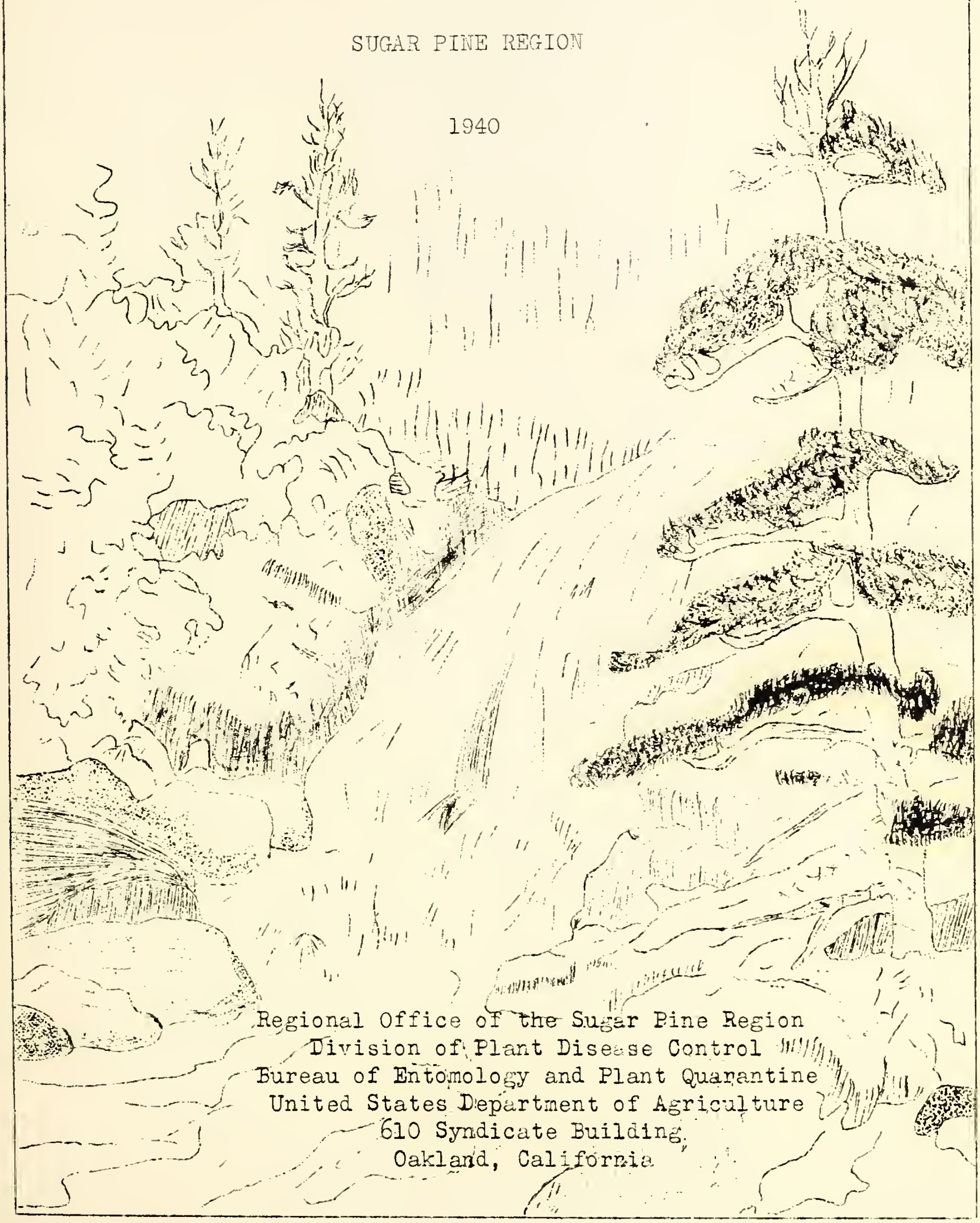
BU. OF ENT. & PLANT QUAR.
Division of Plant Disease Control
WASHINGTON, D. C.

REPORT OF BLISTER RUST CONTROL ACTIVITIES

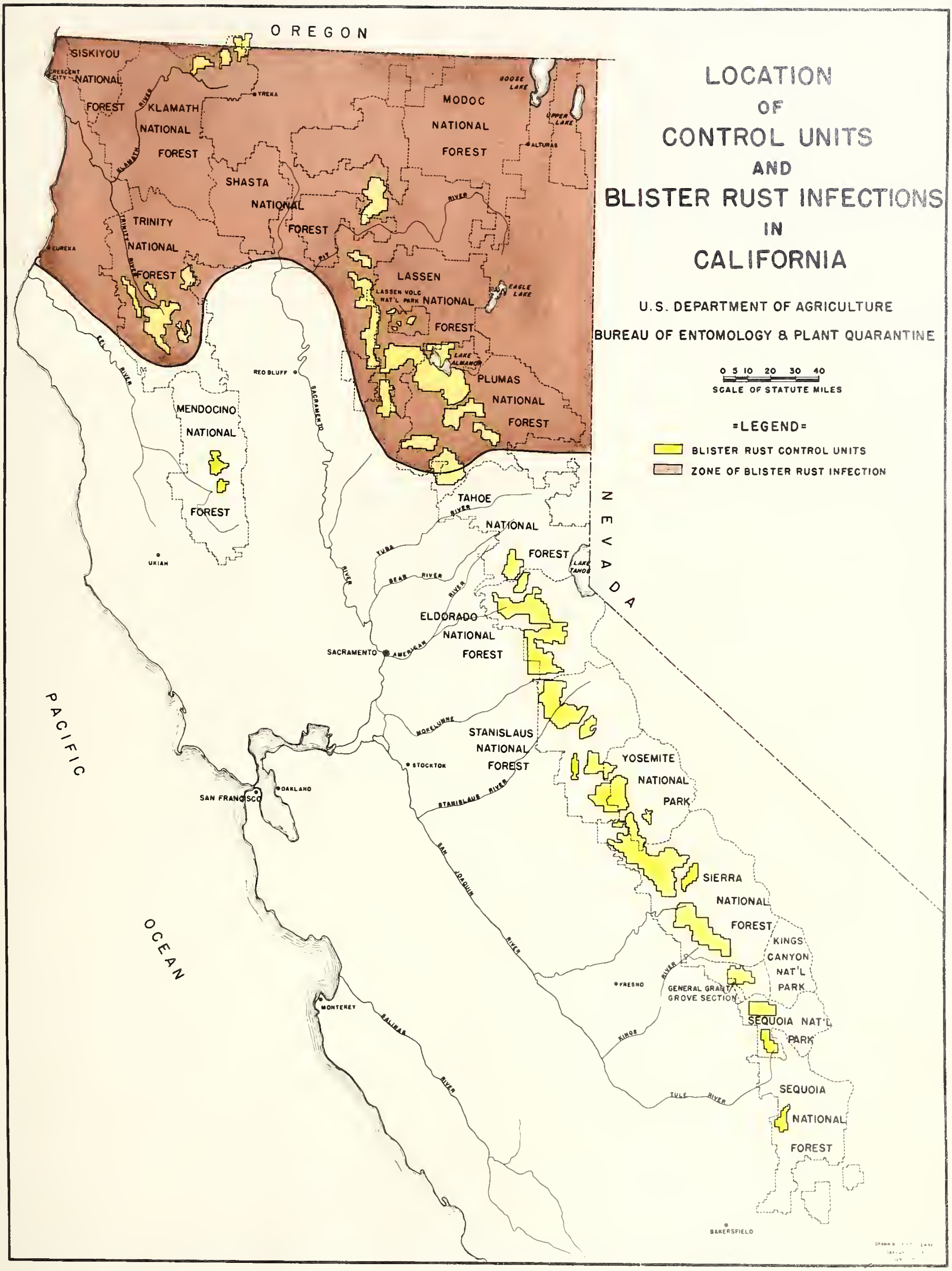
IN THE

SUGAR PINE REGION

1940



Regional Office of the Sugar Pine Region
Division of Plant Disease Control
Bureau of Entomology and Plant Quarantine
United States Department of Agriculture
610 Syndicate Building
Oakland, California


LOCATION
OF
CONTROL UNITS
AND
BLISTER RUST INFECTIONS
IN
CALIFORNIA
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY & PLANT QUARANTINE
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SCALE OF STATUTE MILES
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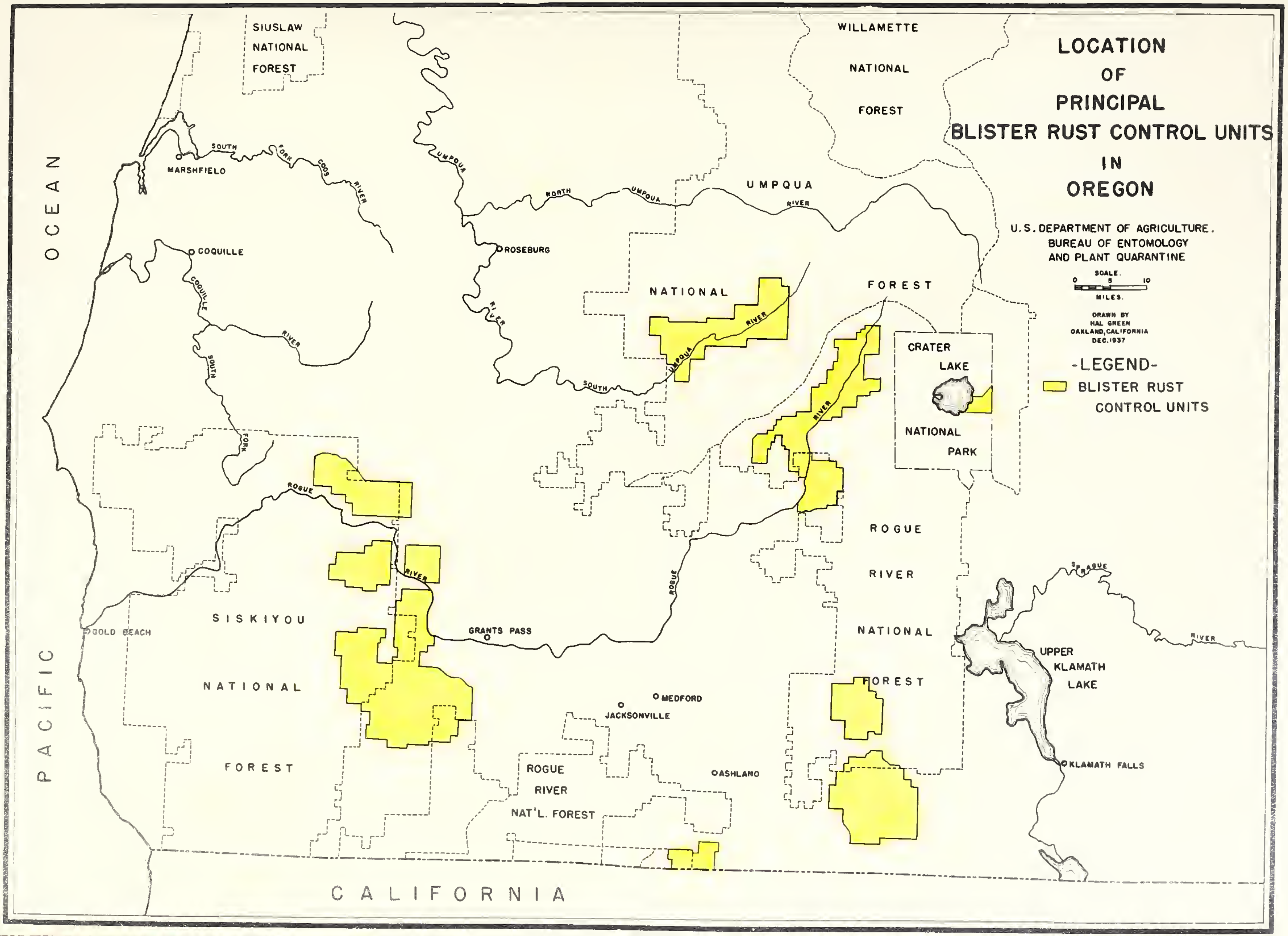
BLISTER RUST CONTROL UNITS
ZONE OF BLISTER RUST INFECTION
OREGON
NEVADA
PACIFIC
OCEAN
SISKIYOU NATIONAL FOREST
CRESCENT CITY
KLAMATH NATIONAL FOREST
KLAMATH RIVER
YREKA
MODOC NATIONAL FOREST
GOOSE LAKE
UPPER LAKE
ALTURAS
SHASTA NATIONAL FOREST
TRINITY NATIONAL FOREST
TRINITY RIVER
EUREKA
PIT RIVER
LASSEN NATIONAL FOREST
LASSEN VOLC NAT'L PARK
EAGLE LAKE
LAKE ALMANOR
PLUMAS NATIONAL FOREST
EEL RIVER
RED BLUFF
SACRAMENTO RIVER
MENDOCINO NATIONAL FOREST
UKIAH
TAHOE NATIONAL FOREST
LAKE TAHOE
YUBA RIVER
BEAR RIVER
ELDORADO NATIONAL FOREST
SACRAMENTO
AMERICAN RIVER
MOKELUMNE
STANISLAUS NATIONAL FOREST
STOCKTON
STANISLAUS RIVER
OAKLAND
SAN FRANCISCO
YOSEMITE NATIONAL PARK
SAN JOAQUIN RIVER
SIERRA NATIONAL FOREST
KINGS CANYON NAT'L PARK
FRESNO
KINGS RIVER
GENERAL GRANT GROVE SECTION
SEQUOIA NAT'L PARK
MONTEREY
SALINAS RIVER
TULE RIVER
SEQUOIA NATIONAL FOREST
BAKERSFIELD


LOCATION
OF
PRINCIPAL
BLISTER RUST CONTROL UNITS
IN
OREGON
U.S. DEPARTMENT OF AGRICULTURE.
BUREAU OF ENTOMOLOGY
AND PLANT QUARANTINE
SCALE.
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HAL GREEN
OAKLAND, CALIFORNIA
DEC. 1937
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BLISTER RUST CONTROL UNITS
SIUSLAW NATIONAL FOREST
WILLAMETTE NATIONAL FOREST
UMPQUA NATIONAL FOREST
CRATER LAKE NATIONAL PARK
ROGUE RIVER NATIONAL FOREST
SISKIYOU NATIONAL FOREST
ROGUE RIVER NAT'L. FOREST
OCEAN
PACIFIC
CALIFORNIA
MARSHFIELD
COQUILLE
ROSEBURG
GRANTS PASS
GOLD BEACH
MEDFORD
JACKSONVILLE
ASHLAND
KLAMATH FALLS
UPPER KLAMATH LAKE
SOUTH FORK COOS RIVER
COQUILLE RIVER
SOUTH FORK
NORTH UMPQUA
UMPQUA
UMPQUA RIVER
SOUTH RIVER
ROGUE RIVER
SPRAGUE RIVER

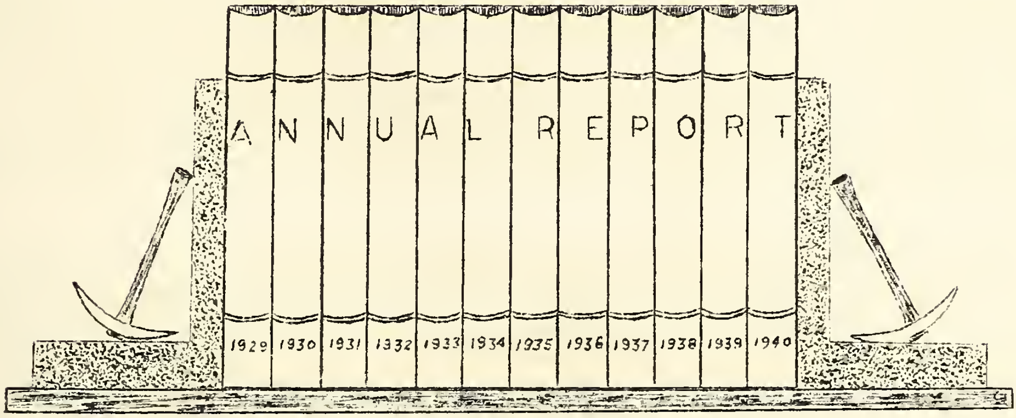
TABLE OF CONTENTS

BLISTER RUST CONTROL IN THE SUGAR PINE REGION 1940

PART I - GENERAL

By

Warren V. Benedict, Senior Forester



INTRODUCTION

The ending of 1940 marks the completion of eight years of relatively large scale blister rust control work in the sugar pine forests of Oregon and California. Control accomplishments during this period are indicated in abbreviated form in the following tabulation:

Status of Blister Rust Control Work in the Sugar Pine Region as of December 31, 1940

Item	Acres
Sugar pine control area	2,729,697
Initial Ribes eradication completed on	828,098
Ribes reeradication completed on	296,235
Complete control established on	341,210
Average per acre cost of eradication to date	$3.18

At the present time the job of initial Ribes eradication is thirty percent completed and the job of establishing full control is eighteen percent completed.

The scope of control activities in the Sugar Pine Region during 1940 followed closely that of 1939, with 2,850 men from the CCC, the WPA, and to a small extent men secured from the open labor market employed on control work under the combined efforts of the Bureau of Entomology and Plant Quarantine, the Forest Service, the National Park Service, and the Oregon and California Revested Lands Administration. Some 19 million Ribes were destroyed from 156,728 acres of sugar pine land, 50,496 acres being initial work and 106,232 acres follow-up work on areas treated initially several years ago.

An important development in the spread of the rust during 1940 was the discovery of two sugar pines infected with blister rust on the Lassen National Forest near the northwestern base of Mt. Lassen in the vicinity of Ribes infections found there in 1938. This infection places the known southern limits of pine infection in California approximately 107 miles south of the Oregon border. Two small pine cankers were also found in the Montgomery Creek area in central Shasta county where numerous infections on Ribes were located in 1938.

On the Klamath National Forest, where infections on Ribes were abundant in 1937 and 1938, infections on pines were correspondingly abundant this year. As a result of scouting work on the Klamath National Forest, it appears probable that pine infections are generally scattered over the entire Klamath region where sugar pines and Ribes occur in association, and probably over the northern end of the Trinity National Forest as well. Within a few years these infections will become focal points for spreading the disease to the south. The ruggedness of the terrain, the scattered nature of much of the sugar pine in this region, the general distribution of the disease and the inaccessibility of the greater part of the area make canker removal and Ribes eradication impracticable over all but small areas of the best pine.

Negative results were obtained in scouting for the rust on Ribes in all areas away from the immediate vicinity of fruiting pine cankers. It thus appears that 1940, like 1939, was another unfavorable year for long-distance spread of infection from pine infection centers in the north to Ribes in California. This factor will be of less significance within a few years because of the development of numerous pine infection centers in California.

ORGANIZATION AND ADMINISTRATION

Blister rust control work in the Sugar Pine Region, comprising the states of Oregon and California, was continued during 1940 as a cooperative undertaking in accord with existing agreements between the Bureau of Entomology and Plant Quarantine and each State, and between the Bureau and Regions 5 and 6 of the Forest Service, Region 4 of the National Park Service, and this year for the first time with the Oregon and California Revested Lands Administration. Control work was undertaken on seven national forests four national parks, and on interspersed State and private and Oregon and

California revested lands. Camp distribution and labor (average approximation) by the participating agencies during 1940 was as follows:

Activity	Number of Camps	Number of Men
EPQ-ERA	8	900
FS-ERA	8	390
FS-CCC	6	600
FS-Regular	7	230
NPS-CCC	9	670
O & C -CCC	1	50
NYA	1	10
Total - -	40	2,850

No direct appropriations for control work were made by the States of California or Oregon but the approximate valuation and the form of contributed services by the State agencies participating in the blister rust control program are shown on pages 12 to 17 inclusive.

The work of the Bureau of Entomology and Plant Quarantine was performed on lands predominantly in State and private ownership and the work of the other Federal agencies on lands predominantly in ownership under their jurisdiction. The position of the Bureau as technical leader, advisor and coordinator of all control work in the Sugar Pine Region was continued as heretofore.

The Bureau's full time appointed personnel engaged in control work in the Sugar Pine Region during 1940 were assigned as follows:

General Supervision:

Warren V. Benedict, Senior Forester .... Regional Leader in Charge
Thomas H. Harris, Forester .... Assistant Regional Leader

Oregon Operation:

Conrad P. Wessela, Associate Forester....... Technical Supervisor
Lyle N. Anderson, Agent .... Checking Supervisor

California Operations:

Lassen Volcanic National Park, Lassen and Plumas National Forests

Benton Howard, Associate Forester .... Technical Supervisor
Robert Sovulewski, Agent .... Assistant Technical Supervisor
S. Daryl Adams, Agent .... Checking Supervisor
John C. Crowell, Agent .... Checking Supervisor

Eldorado and Stanislaus National Forests

Roy Blomstrom, Associate Forester .... Technical Supervisor
Carl W. Fowler, Assistant Forester .... Checking Supervisor
*Glenn J. Taylor, Agent .... Acting Checking Supervisor

Yosemite and Kings Canyon National Parks, Sierra National Forest

Frank A. Patty, Associate Pathologist ..... Technical Supervisor
John N. Mitchell, Assistant Forester ...... Checking Supervisor

Reconnaissance and Scouting

Douglas R. Miller, Associate Forester ..... Project Supervisor
Winfield B. Dunshee, Agent .... Assistant Project Supervisor

Developmental Work in Control Methods (Berkeley Office)

Harold R. Offord, Pathologist .... In Charge
Clarence R. Quick, Assistant Pathologist
Lawrence P. Winslow, Agent
Catherine Ryan, Junior Clerk-Stenographer

Office Administration, Oakland Regional Office

Ralph H. Simons, Jr. Administrative Assist. Executive Assistant in Charge
Orvis R. Decious, Clerk .... Accounts and Procurements
*Ernest G. Pinnella, Agent .... Property, Warehouse Foreman
Loa H. Smith, Assistant Clerk .... Pay Rolls
Juliana Arca, Jr. Clerk-Stenographer ...... Assistant on Pay Rolls
Rose E. Yaras, Clerk-Stenographer .... Personnel, Secretarial, In charge of Typing
Eudora S. DeTennencourt, Jr. Clerk-Stenographer ..... Assistant
Frances H. Greenfield, Assistant Clerk-Stenographer ..... Secretarial, files, expense accounts, leave records

*Paid from ERA Project Funds while in furlough status.

The Forest Service staff men assigned to blister rust control work were as follows:

Ralph A. James, Assistant Forester	Plumas National Forest
Charles E. M. Carlson, Jr. Range Examiner..	Assistant on Plumas National Forest
Eugene H. Kincaid, Agent	Eldorado National Forest
Arthur London, Assistant Forester	Stanislaus National Forest

Clarence E. Dunston, Assistant Chief, Division of Timber Management represented the Forest Service Regional Office of the California Region in all matters pertaining to blister rust control work; Maurice Thede, Associate Forester, the Regional Office of the National Park Service; and Mark J. Pike, Associate Forester, the Oregon and California Revested Lands Administration.

FINANCIAL

The field project, since its inception in 1933, has been financed largely with funds allotted by several of the emergency relief programs. The size of the emergency relief blister rust program has been governed by the availability of qualified relief labor and owing to improved conditions of private employment throughout the region as a whole, the quantity and quality of relief labor available for blister rust work has decreased materially each year. Moreover, each year has seen more and more control of the WPA project funds transferred to Federal agencies withheld by the WPA itself. Important developments in this direction during 1940 were the inauguration of a quarterly inspection service of Federal agency projects by the WPA, the insistence that all project employees, supervisory as well as others, be employed and paid in accordance with WPA schedules and procedures and the modification of camp operating procedures to comply with changes established by the WPA. The general tendency of this action has been further to decrease the effectiveness of field work already sharply restricted because of rigid regulations governing the employment of laborers and the expenditure of funds.

Table 1 shows the total allotments to the Bureau of Entomology and Plant Quarantine and to the California Region of the Forest Service for blister rust control in the Sugar Pine Region during the fiscal year 1940 (July 1, 1939 to June 30, 1940) and the total allotments for the fiscal year 1941 (July 1, 1940 to June 30, 1941) as they were known as of the end of the calendar year 1940. The figures shown for the fiscal year 1941 are subject to change, however, due to increase or recessions being made during the last half of the fiscal year.

Expenditures of CCC funds for blister rust control work by the Forest Service, the National Park Service, and the Oregon and California Revested Lands Administration are not included in the following tables but may be found in Table 4 of the omnibus tables on page 21. The arbitrary amount of $1.50 per effective 8-hour man day is used in arriving at a valuation of CCC enrollee labor.

No allocation of regular or ERA funds for blister rust control work was made during 1940 by Forest Service Region 6.

In Table 3 is shown a record of the classified expenditures of funds of the Bureau of Entomology and Plant Quarantine for the calendar year 1940.

TABLE 1

FISCAL YEAR ALLOTMENT FROM WHICH EXPENDITURES DURING CALENDAR YEAR 1940 WERE MADE

Sugar Pine Region - Bureau of Entomology and Plant Quarantine

	Fiscal Year 1940	Fiscal Year 1941
Regular Funds	$ 45,030.00	$ 62,100.00
ERA Administrative	7,770.00	5,100.00
ERA Field	295,000.00*	193,550.00**
Total	$347,800.00	$260,750.00

* California $233,800.00 plus Oregon $61,200.00
** California $159,000.00 plus Oregon $34,550.00

U. S. Forest Service, California Region

	Fiscal Year 1940	Fiscal Year 1941
Regular Funds	$184,000.00	$177,780.00
ERA Field	148,192.00	53,018.00
Total	$332,192.00	$230,798.00

TABLE 2

EXPENDITURES FOR CALENDAR YEAR 1940

Bureau of Entomology and Plant Quarantine

	California	Oregon	Total
1. Regular Funds:			
Fiscal Year 1940	$ 20,344.35	$ 4,029.14	$ 24,373.49
Fiscal Year 1941	25,160.54	4,529.42	29,689.96
Total - - - - -	$ 45,504.89	$ 8,558.56	$ 54,063.45
2. ERA Administrative Funds:			
Fiscal Year 1940	$ 5,038.51	-	$ 5,038.51
Fiscal Year 1941	3,017.50	-	3,017.50
Total - - - - -	$ 8,056.01	-	$ 8,056.01
3. ERA Project Funds:			
Fiscal Year 1940	$100,870.84	$28,100.93	$128,971.77
Fiscal Year 1941	117,789.48	21,240.33	139,029.81
Total - - - - -	$218,660.32	$49,341.26	$268,001.58
4. All Funds:			
Fiscal Year 1940	$126,253.70	$32,130.07	$158,383.77
Fiscal Year 1941	145,967.52	25,769.75	171,737.27
Total - - - - -	$272,221.22	$57,899.82	$330,121.04

U. S. Forest Service, California Region

1. Regular Funds:	
Fiscal Year 1940	$ 69,306.72
Fiscal Year 1941	104,713.43
Total	$174,020.15
2. ERA Project Funds:	
Fiscal Year 1940	$ 57,925.24
Fiscal Year 1941	51,283.00
Total	$109,208.24
3. All Funds:	
Fiscal Year 1940	$127,231.96
Fiscal Year 1941	155,996.43
Total	$283,228.39

TABLE 3

CLASSIFIED BUREAU EXPENDITURES BY APPROPRIATIONS AND PROJECTS - SUGAR PINE REGION

January 1 to December 31, 1940

Item	Appropriation and Symbol Number	California Ribes Eradication Projects: Plumas Operation	California Ribes Eradication Projects: Eldorado Operation	California Ribes Eradication Projects: Stanislaus Operation	Overhead and General Expense	Methods Unit Berkeley*	Total	Oregon: Ribes Eradication	Oregon: Overhead and General Expense	Oregon: Total	Sugar Pine Region Grand Totals
Salaries: Permanent Employees	EQ-Regular 1201300.000	-	-	-	$15,188.26	-	$ 15,188.26	-	$4,029.14	$ 4,029.14	$ 19,217.40
	" " 1211300.000	-	-	-	19,677.12	-	19,677.12	-	3,049.92	3,049.92	22,727.04
	ERA-Emergency 201087-650999	-	-	-	2,003.32	-	2,003.32	-	-	-	2,003.32
	" " 401087-651999	-	-	-	2,014.56	-	2,014.56	-	-	-	2,014.56
	" Administrative 201088-650999	-	-	-	4,277.50	-	4,277.50	-	-	-	4,277.50
	" " 401008-651999	-	-	-	3,000.00	-	3,000.00	-	-	-	3,000.00
Total - - - - - - - - - - - - - - - - - -		-	-	-	46,160.76	-	46,160.76	-	7,079.06	7,079.06	53,239.82
Salaries: Temporary Employees	EQ-Regular 1201300.000	$ 994.08	$ 650.25	$ 420.75	112.00	-	2,177.08	-	-	-	2,177.08
	" " 1211300.000	-	610.75	-	748.78	-	1,359.53	$1,175.24	-	1,175.24	2,534.77
	ERA-Emergency 201087-650999	14,558.95	14,714.38	12,963.38	11,196.57	$ 809.21	54,242.49	20,877.77	-	20,877.77	75,120.26
	" " 401087-651999	23,743.40	27,861.56	20,500.89	10,153.55	1,078.47	83,337.87	17,926.33	-	17,926.33	101,264.20
	" Administrative 201088-650999	-	-	-	-	-	-	-	-	-	-
	" " 401008-651999	-	-	-	-	-	-	-	-	-	-
Total - - - - - - - - - - - - - - - - - -		39,296.43	43,836.94	33,885.02	22,210.90	1,887.68	141,116.97	39,979.34	-	39,979.34	181,096.31
Equipment: Non- and Semi-Expendable	EQ-Regular 1201300.000	-	-	-	1,834.74	-	1,834.74	-	-	-	1,834.74
	" " 1211300.000	-	-	-	637.71	-	637.71	-	-	-	637.71
	ERA-Emergency 201087-650999	-	-	-	3,830.64	-	3,830.64	-	108.85	108.85	3,939.49
	" " 401087-651999	-	-	-	242.67	-	242.67	-	12.39	12.39	255.06
	" Administrative 201088-650999	-	-	-	342.38	-	342.38	-	-	-	342.38
	" " 401008-651999	-	-	-	-	-	-	-	-	-	-
Total - - - - - - - - - - - - - - - - - -		-	-	-	6,888.14	-	6,888.14	-	121.24	121.24	7,009.38
Subsistence Supplies	EQ-Regular 1201300.000	-	-	-	-	-	-	-	-	-	-
	" " 1211300.000	-	-	-	48.41	-	48.41	107.32	-	107.32	155.73
	ERA-Emergency 201087-650999	6,980.35	10,348.61	7,427.79	416.37	-	25,173.12	3,830.05	-	3,830.05	29,003.17
	" " 401087-651999	7,870.23	7,212.39	6,480.74	2,192.80	-	23,756.16	2,292.01	-	2,292.01	26,048.17
	" Administrative 201088-650999	-	-	-	-	-	-	-	-	-	-
	" Administrative 401008-651999	-	-	-	-	-	-	-	-	-	-
Total - - - - - - - - - - - - - - - - - -		14,850.58	17,561.00	13,908.53	2,657.58	-	48,977.69	6,229.38	-	6,229.38	55,207.07
Miscellaneous Supplies and Other Expenses	EQ-Regular 1201300.000	-	-	-	274.31	-	274.31	-	-	-	274.31
	" " 1211300.000	-	-	-	1,708.62	-	1,708.62	-	112.66	112.66	1,821.28
	ERA-Emergency 201087-650999	2,159.59	2,062.05	1,614.82	4,888.58	-	10,725.04	391.75	1,764.72	2,156.47	12,881.51
	" " 401087-651999	519.26	508.59	485.46	3,460.97	-	4,974.28	45.49	492.41	537.90	5,512.18
	" Administrative 201088-650999	-	-	-	90.19	-	90.19	-	-	-	90.19
	" " 401008-651999	-	-	-	11.58	-	11.58	-	-	-	11.58
Total - - - - - - - - - - - - - - - - - -		2,678.85	2,570.64	2,100.28	10,434.25	-	17,784.02	437.24	2,369.79	2,807.03	20,591.05
Transportation and Travel	EQ-Regular 1201300.000	8.50	7.19	27.73	826.54	-	869.96	-	-	-	869.96
	" " 1211300.000	137.81	76.92	70.90	1,443.52	-	1,729.15	84.28	-	84.28	1,813.43
	ERA-Emergency 201087-650999	1,502.85	1,503.77	1,446.00	396.90	46.71	4,896.23	1,127.79	-	1,127.79	6,024.02
	" " 401087-651999	946.25	1,061.59	922.22	527.41	6.47	3,463.94	471.70	-	471.70	3,935.64
	" Administrative 201088-650999	-	-	-	328.44	-	328.44	-	-	-	328.44
	" " 401008-651999	-	-	-	5.92	-	5.92	-	-	-	5.92
Total - - - - - - - - - - - - - - - - - -		2,595.41	2,649.47	2,466.85	3,528.73	53.18	11,293.64	1,683.77	-	1,683.77	12,977.41
Totals by Appropriations	EQ-Regular 1201300.000	1,002.58	657.44	448.48	18,235.85	-	20,344.35	-	4,029.14	4,029.14	24,373.49
	" " 1211300.000	137.81	687.67	70.90	24,264.16	-	25,160.54	1,366.84	3,162.58	4,529.42	29,689.96
	ERA-Emergency 201087-650999	25,201.74	28,628.81	23,451.99	22,732.38	855.92	100,870.84	26,227.36	1,873.57	28,100.93	128,971.77
	" " 401087-651999	33,079.14	36,644.13	28,389.31	18,591.96	1,084.94	117,789.48	20,735.53	504.80	21,240.33	139,029.81
	" Administrative 201088-650999	-	-	-	5,038.51	-	5,038.51	-	-	-	5,038.51
	" " 401008-651999	-	-	-	3,017.50	-	3,017.50	-	-	-	3,017.50
Grand Totals - - - - - - - - - - - - - - - -		$59,421.27	$66,618.05	$52,360.68	$91,880.36	$1,940.86	$272,221.22	$48,329.73	$9,570.09	$57,899.82	$330,121.04

*Amounts shown in this column represent funds allotted to the Sugar Pine Regional office that were expended on activities of the Methods Unit. In addition, the Oakland office processed vouchers in the amount of $18,669.12 of Regular Funds allotted directly to the Methods Unit for work in both the Sugar Pine and Northwestern Regional Blister Rust Control office.

In accord with the cooperative agreement between the California Region of the Forest Service and the Sugar Pine Regional Office of the Bureau, reimbursement was made to the Bureau by the Forest Service for the cost of checking and checking supervision extended by the Bureau to the control project on national forest lands. Salaries and expenses of checking supervisors Carl W. Fowler, Assistant Forester, and S. Daryl Adams, Agent, were thus paid by the Forest Service on a reimbursement basis. From January 1 to July 31 the salary and expenses of Eugene H. Kincaid, Agent, who was assigned by the Bureau as Forest Service blister rust officer on the Eldorado National Forest, were borne by the Forest Service. On August 1, Mr. Kincaid was transferred to the Forest Service.

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The special omnibus summaries of blister rust activities in the Sugar Pine Region, inaugurated in 1936 by the Washington Office of the Division of Plant Disease Control of the Bureau, have been revised to include accomplishments of 1940. Omnibus tables numbered 1 and 1-A, 2 and 2A, 3 and 3A, 4, 4A, and 4B, 5 and 5A, and 6 inclusive, appear at the end of this section of the annual report beginning on page 18.

During the year several reports and studies were made by the Bureau's regular staff, while not included in the annual report, are worthy of mention. Among the special reports may be noted:

1. REPORT OF RECONNAISSANCE OF FOXTAIL PINE STANDS IN THE KERN RIVER BASIN OF SEQUOIA NATIONAL PARK, by Thomas H. Harris; an account of white pine stands and Ribes conditions in the High Sierra of Sequoia National Park from the point of view of blister rust control.

2. RECONNAISSANCE OF WHITE PINES AND RIBES IN KINGS CANYON NATIONAL PARK, by Thomas H. Harris and Frank A. Patty; a report covering white pine stands and Ribes conditions in the High Sierra of Kings Canyon National Park from the point of view of blister rust control.

3. THE SAMPLING OF RIBES POPULATIONS IN BLISTER RUST CONTROL WORK, by Thomas H. Harris; an exposition of the purposes and the methods of the phase of blister rust control work known as "checking." Approved by Washington for publication in Journal of Forestry in 1941.

4. NOTES ON THE EXPLORATORY STUDIES CONCERNING THE RELIABILITY OF CHECKING STUDIES, by S. Daryl Adams and John N. Mitchell; an attempt to interpret by statistical means the significance and limitations of checking data, particularly as related to small areas.

5. BLISTER RUST THREATENS THE SUGAR PINE, by Winfield B. Dunshee; a popular article dealing with the problem of white pine blister rust in the Sugar pine stands of California and Oregon. The article was approved by Washington and subsequently published in "American Forests" - October 1939.

6. A STUDY OF THE PINE COUNTS MADE ON BLISTER RUST RECONNAISSANCE WITHIN THE SUGAR PINE TYPE OF CALIFORNIA, by Frank A. Patty and Charles E. M. Carlson; a study throwing light on the stocking of sugar pine by size classes on marginal sites.

7. THE CONTROL OF THE BLISTER RUST DISEASE IN THE WHITE PINE REGION OF OREGON AND CALIFORNIA, compiled by Winfield B. Dunshee; a motion picture in technicolor showing the problem of blister rust control in the Sugar Pine Region and various aspects of control work. Designed primarily for intra-office training purposes, but on several occasions upon request presented to public audiences and school groups.

The detailed results of Ribes eradication, advance, regular, and post checking, scouting, reconnaissance, and methods studies are discussed in separate sections of this report as follows:

Part II -- Ribes Eradication: By Roy Blomstrom and Conrad P. Wessela, Associate Foresters

Part III-- Checking: By S. Daryl Adams, Agent

Part IV -- Scouting: By Douglas R. Miller, Associate Forester, and Harry G. Lachmund, Agent

Part V -- Reconnaissance: By Douglas R. Miller, Associate Forester

Part VI -- Methods Studies: By Harold R. Offord, Pathologist, Lawrence P. Winslow, Agent, and Clarence R. Quick, Assistant Pathologist

MEMORANDA OF AGREEMENT

Between the

Bureau of Entomology and Plant Quarantine

and

<u>Oregon</u>

1. Oregon State Board of Forestry, Salem, Oregon

2. Bureau of Plant Industry, Oregon State Department of Agriculture, Salem, Oregon

<u>California</u>

1. Division of Forestry, California Department of Natural Resources, Sacramento, California

2. California Department of Agriculture, Sacramento, California

3. College of Agriculture, University of California, Berkeley, California

4. Botanical Garden, University of California, Berkeley, California

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

May 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of Oregon during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these figures.

Funds appropriated or allotted	Available funds Amount	Explanation
State Blister Rust appropriation.........		
Allotted from other State appropriations.		
County and township appropriations.......		
Funds from other sources (give source)...		
Total available funds........................		

Contributed Service	Available services Estimated value	Explanation
Nursery inspection, law enforcement, and other aid of regulatory officials...		
Technical services of State employees...	$500	
Office, greenhouse & Laboratory space...		
Use of office appliances...............		
Clerical assistance....................		
Use of trucks & other field equipment...		
Property owner and other labor..........		
Value of cultivated Ribes to be destroyed (10¢ per bush)...............		
Total contributed services....................		

Total State and local cooperation.................... ________

Remarks: The Oregon State Board of Forestry agrees: To use its regular employees insofar as their other duties permit to scout for white pine blister rust and to assist in the compilation of information concerning location, ownership and volume of white and sugar pine stands as a basis for control work.

Very truly yours,

Name: N. S. Rogers (s)

Title: State Forester
Oregon State Board of Forestry

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

May 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of Oregon during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these fitures.

Funds appropriated or allotted	Available funds Amount	Explanation
State Blister Rust appropriation.........		
Allotted from other State appropriations.		
County and township appropriations.......		
Funds from other sources (give source)...		
Total available funds....................		

Contributed Service	Available services Estimated value	Explanation
Nursery inspection, law enforcement, and other aid of regulatory officials...	$500	
Technical services of State employees...		
Office, greenhouse & Laboratory space...		
Use of office appliances................		
Clerical assistance.....................		
Use of trucks & other field equipment...		
Property owner and other labor..........		
Value of cultivated Ribes to be destroyed (10¢ per bush)................		
Total contributed services..............		
Total State and local cooperation.......		

Remarks: The Bureau of Plant Industry of the Oregon State Department of Agriculture agrees: To use its regular employees insofar as their other duties permit to scout for white pine blister rust, inspect nurseries for the disease, and enforce such state laws as may be necessary for the effective prosecution of blister rust control.

Very truly yours,

Name: Frank McKennon (s)

Title: Chief

Division of Plant Industry, Oregon State Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

May 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of California during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these figures.

Funds appropriated or allotted	Available funds Amount		Explanation
State Blister Rust appropriation.........			
Allotted from other State appropriations.			
County and township appropriations.......			
Funds from other sources (give source)...			
Total available funds........................			

Contributed Service	Available services Estimated value		Explanation
Nursery inspection. law enforcement, and other aid of regulatory officials...			
Technical services of State employees...	$500		
Office, greenhouse & Laboratory space...			
Use of office appliances...............			
Clerical assistance....................			
Use of trucks & other field equipment...			
Property owner and other labor..........			
Value of cultivated Ribes to be destroyed (10¢ per bush)................			
Total contributed services....................		$500	
Total State and local cooperation....................			

Remarks: The Division of Forestry of the California State Department of Natural Resources agrees: To use its regular employees insofar as their other duties permit to scout for white-pine blister rust and to assist in the compilation of information concerning location, ownership, and volume of sugar-pine stands as a basis for control work.

Very truly yours,

Name: M. B. Pratt (s)

Title: State Forester

Division of Forestry, California Department of Natural Resources

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

May 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of California during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these figures.

Funds appropriated or allotted	Available funds Amount	Explanation
State Blister rust appropriation.........		
Allotted from other State appropriations.		
County and township appropriations.......		
Funds from other sources (give source)...		
Total available funds........................		

Contributed Service	Available services Estimated value	Explanation
Nursery inspection, law enforcement, and other aid of regulatory officials...	$6500	
Technical services of State employees...	500	
Office, greenhouse & Laboratory space...		
Use of office appliances................		
Clerical assistance.....................		
Use of trucks & other field equipment...		
Property owner and other labor..........		
Value of cultivated Ribes to be destroyed (10¢ per bush)................		
Total contributed services....................	$7000	

Total State and local cooperation....................

Remarks: The California State Department of Agriculture agrees: To use its regular employees insofar as their other duties permit to scout for white-pine blister rust, inspect nurseries for the disease, and enforce such state laws as may be necessary for the effective prosecution of blister rust control and the prevention of the spread of blister rust into and within the state.

Very truly yours,

Name: W. B. Parker (s)

Title: Director
California Department of Agriculture

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

May 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of California during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these figures.

Funds appropriated or allotted	Available funds Amount	Explanation
State Blister Rust appropriation.........		
Allotted from other State appropriations.		
County and township appropriations.......		
Funds from other sources (give source)...		

Total available funds.............................

Contributed Service	Available services Estimated value	Explanation
Nursery inspection, law enforcement, and other aid of regulatory officials...		
Technical services of State employees...		
Office, greenhouse & Laboratory space...	$2500	
Use of office appliances................		
Clerical assistance.....................		
Use of trucks & other field equipment...		
Property owner and other labor..........		
Value of cultivated Ribes to be destroyed (10¢ per bush)................		

Total contributed services.......................... $2500

Total State and local cooperation..........................

Remarks: The College of Agriculture, University of California agrees: To provide laboratory and office facilities through the University Division of Forestry for employees of the Bureau of Entomology and Plant Quarantine to conduct technical studies upon methods of Ribes eradication and to furnish technical advice and records bearing upon the control of white pine blister rust.

Very truly yours,

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By James H. Corley (s)
James H. Corley, Acting Comptroller

Name: C. B. Hutchison (s)

Title: Dean, College of Agriculture
University of California

UNITED STATES DEPARTMENT OF AGRICULTURE
Bureau of Entomology and Plant Quarantine

M·y 10, 1940

Division of Plant Disease Control,
Bureau of Entomology and Plant Quarantine,
Washington, D. C.

Gentlemen:

There is indicated below the extent to which State, county and local agencies and individuals are expected to contribute cash or services toward the cooperative blister rust control program in the State of California during the fiscal year July 1, 1940, to June 30, 1941. The estimated value of personal services is based on the amount of time to be spent on blister rust control. You will be notified promptly if it should later become necessary to revise these figures.

Funds appropriated or allotted	Available funds Amount	Explanation
State Blister Rust appropriation.........		
Allotted from other State appropriations.		
County and township appropriations.......		
Funds from other sources (give source)...		
Total available funds........................		

Contributed Service	Available services Estimated value	Explanation
Nursery inspection, law enforcement, and other aid of regulatory officials...		
Technical services of State employees...		
Office, greenhouse & Laboratory space...	$200	
Use of office appliances................		
Clerical assistance.....................		
Use of trucks & other field equipment...		
Property owner and other labor..........		
Value of cultivated Ribes to be destroyed (10¢ per bush)...............		
Total contributed services....................	$200	
Total State and local cooperation....................		

Remarks: The Botanical Garden of the University of California agrees: To supply the Bureau of Entomology and Plant Quarantine with garden facilities for the maintenance of a collection of Ribes species.

Very truly yours,

THE REGENTS OF THE UNIVERSITY OF CALIFORNIA

By James H. Corley (s)
James H. Corley, Acting Comptroller

Name T. H. Goodspeed (s)

Title: Director, Botanical Garden
University of California

Omnibus Tables

TABLE 1

SUMMARY OF 1940 RIBES ERADICATION

State	Initial Eradication Work				Reeradication Work				Totals				Percent Initial Eradication Worked
	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	
		Wild	Cultivated			Wild	Cultivated			Wild	Cultivated		
California	36,574	8,656,044	-	58,615	105,755	9,184,525	-	73,205	142,329	17,840,569	-	131,820	1.66
Oregon	13,922	829,237	-	10,216	477	32,905	-	243	14,399	862,142	-	10,459	2.57
Total - - -	50,496	9,485,281	-	68,831	106,232	9,217,430	-	73,448	156,728	18,702,711	-	142,279	1.84

State	Ribes Per Acre		Man Days Per Acre		Number of Camps				Number of Employees					
	Initial Eradication	Reeradication	Initial Eradication	Reeradication	CCC	WPA	Regular	Total	Laborers				All Supervision	Employees
									CCC	WPA	Regular	Total		
California	237	87	1.60	0.69	14	14	7	35	1,245	1,100	230	2,575	153	2,728
Oregon	60	69	0.73	0.51	2	3*	-	5	75	200	-	275	15	290
Total - - -	188	87	1.36	0.69	16	17	7	40	1,320	1,300	230	2,850	168	3,018

* 1 NYA Camp

TABLE 1A

SUMMARY OF ALL RIBES ERADICATION 1918-1940 (INCLUSIVE)

State	Total Acreage White Pine	Acreage White Pine Worth Protection	Acreage Control Areas (White Pine and Protective Zone)	Acreage Reported Initially Worked	Initial Eradication Work			
					Net Acreage Worked in Control Areas	Number Ribes Destroyed		Number 8-Hour Man Days
						Wild	Cultivated	
California	3,051,568	2,203,204	2,203,204	617,192	617,192	100,945,809	-	460,527
Oregon	526,493	526,493	526,493	210,906	210,906	17,516,256	-	66,729
Mt. Hood Unit Abandoned**	-	-	-	-	2,649	194,292	-	1,651
Total - - -	3,578,061	2,729,697	2,729,697	828,098	828,098	118,462,065	-	527,256

State	Reeradication				Totals				Percent Initial Eradication Worked	Per Acre			
	Acreage Worked	Number Ribes Destroyed		Number 8-Hour Man Days	Net Acreage Worked in Control Areas	Number Ribes Destroyed		Number 8-Hour Man Days		Ribes		Man Days	
		Wild	Cultivated			Wild	Cultivated			Initial Eradication	Reeradication	Initial Eradication	Reeradication
California	263,145	22,182,906	-	155,373	880,337	123,128,715	-	615,900	28.01	163	84	0.75	0.59
Oregon	33,090	908,783	-	7,458	243,996	18,425,039	-	74,187	39.00	83	27	0.32	0.23
Mt. Hood Unit Abandoned**	1,766	357,856	-	1,337	4,415	552,148	-	2,988	-	-	-	-	-
Total - - -	296,235	23,091,689	-	162,831	1,124,333	141,553,754	-	690,087	30.18	143	78	0.64	0.55

**Although the Mt. Hood Control Unit in Oregon has been abandoned, the figures for past work in the unit are shown here in accord with the purpose of the table. In order to secure agreement between the totals of this table and those of other summary tables which represent the present status of control units and from which therefore, all figures for Mt. Hood work have been deleted, the Mt. Hood figures are not included in the totals above.

TABLE 2

SUMMARY OF 1940 RIBES ERADICATION BY PROGRAMS
(Including All Work - Initial and Reeradication)

State	Total Acreage Worked (Initial and Reeradication)	Regular and Cooperative				WPA and ERA				ECW and SCS				Totals			
		Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days
California	142,329	36,520	3,741,158	-	18,098	71,054	5,285,112	-	48,478	34,755	8,814,299	-	65,244	142,329	17,840,569	-	131,820
Oregon	14,399	-	-	-	-	*8,114	*627,777	-	*8,193	6,285	234,365	-	2,266	14,399	862,142	-	10,459
Total - - -	156,728	36,520	3,741,158	-	18,098	79,168	5,912,889	-	56,671	41,040	9,048,664	-	67,510	156,728	18,702,711	-	142,279

*Includes NYA work: 830 acres, 5,019 Ribes, 352 man days.

TABLE 2A

SUMMARY OF ALL RIBES ERADICATION BY PROGRAMS 1918-1940 INCLUSIVE
(Initial and Reeradication)

State	Total Acreage Worked (Initial and Reeradication)	Regular and Cooperative				WPA and ERA				ECW and SCS				PWA or NRA				Total Emergency Program (WPA - ECW - PWA)			
		Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed Wild	Number Ribes Destroyed Cultivated	Number 8-Hour Man Days
California	880,337	127,665	7,893,797	-	39,892	405,279	69,583,697	-	313,726	138,239	24,265,870	-	189,403	209,154	21,385,351	-	72,879	752,672	115,234,918	-	576,008
Oregon	243,996	2,887	202,468	-	1,475	*205,334	*15,441,261	-	*62,461	7,430	354,278	-	2,642	28,345	2,427,032	-	7,609	241,109	18,222,571	-	72,712
Mt. Hood Unit Abandoned**	4,415	1,894	183,304	-	1,602	-	-	-	-	-	-	-	-	2,521	368,844	-	1,386	2,521	368,844	-	1,386
Total - -	1,124,333	130,552	8,096,265	-	41,367	610,613	85,024,958	-	376,187	145,669	24,620,148	-	192,045	237,499	23,812,383	-	80,488	993,781	133,457,489	-	648,720

* Includes NYA work: 830 acres, 5,019 Ribes, 352 man days.
** See footnote Table 1A (Omnibus) page 18.

TABLE 3

SUMMARY OF ALL OTHER CONTROL WORK FOR 1940

State	Cultivated Black Currant Eradication				Nursery Sanitation						Preeradication Survey	
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man Days	Number Nurseries Worked	Number White Pines in Nurseries	Number Acres Worked	Number Ribes Destroyed: Wild	Number Ribes Destroyed: Culti-vated	Number 8-Hour Man Days	Number Acres Mapped White Pine and Pro-tection Zones	Number 8-Hour Man Days
California	-	-	-	-	-	-	-	-	-	-	100,258	320
Oregon	-	-	-	-	1	-	830	5,019	-	352	-	-
Total -	-	-	-	-	1	-	830	5,019	-	352	100,258	320

State	Treatment Infected Trees					Checking					
						Advance		Post		Regular	
	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days	Acreage Checked	Number 8-Hour Man Days
California	5,791	-	-	-	100	74,948	864 5/8	103,126	1,398 7/8	121,112	3,061
Oregon	-	-	-	-	-	18,151	199 7/8	15,661	198 3/8	9,132	213
Total -	5,791	-	-	-	100	93,099	1,064 4/8	118,787	1,597 2/8	130,244	3,274

TABLE 3A

SUMMARY OF ALL OTHER CONTROL WORK, 1918-1940 (INCLUSIVE)

State	Cultivated Black Currant Eradication				Nursery Sanitation								Preeradication Survey		Treatment Infected White Pine				
					Number of Nurseries		Number of Acres Worked			Number Ribes Destroyed									
	Number Inspections Made	Number Locations Found	Number Black Currants Destroyed	Number 8-Hour Man Days	Sanita-tion Zone Maintained	Sanita-tion Zone Abandoned	Nurseries Maintain-ing Zones	Nurseries Which Abandoned Zones	Total Acreage	Wild	Culti-vated	Number 8-Hour Man Days	Number Acres Mapped White Pine and Pro-tection Zones	Number 8-Hour Man Days	Number Trees Examined	Number Trees Treated	Number Trees Removed	Number Cankers Removed	Number 8-Hour Man Days
California	3,298	657	8,621	2,182	1	-	1	-	42	38	-	22	1,188,388	3,720	40,791	-	9	-	321
Oregon	no data	1,671	52,202	no data	3	-	3	-	1,856*	21,814*	-	771*	348,743	1,847	1,316	-	247	-	252
Total	3,298	2,328	60,823	2,182	4	-	4	-	1,898	21,852	-	793	1,537,131	5,567	42,107	-	256	-	573

* Data incomplete; Includes reeradication on Wind River Nursery in 1939.

TABLE 4

SUMMARY OF EXPENDITURES FOR 1940

State	Total			Recapitulation of Federal Funds													
				Regular Funds			Emergency Funds				By Activities (Federal and State)						
	Federal (All Agencies Including State WPA Projects)	State (Includes All Cooperative Funds)	Grand Total	Bureau of Entomology and Plant Quarantine	Forest Service	Department of Interior	Federal WPA and NYA	State WPA	ECW and SCS	Total Emergency Funds	Supervision Includes State and District Leaders	Ribes Eradication	Cultivated Black Currant Eradication	Nursery Sanitation	Canker Elimination	Pre-eradication Survey	All Other - (Checking, Field Data, and Miscellaneous)
CALIFORNIA:																	
Bureau - EQ	$272,221	-	$272,221	$45,505	-	-	$226,716	-	-	$226,716	$46,161	$173,869	-	-	-	$1,968	$50,223
Forest Service	350,122	-	350,122	-	$174,020	-	109,208	-	$66,894	176,102	37,624	283,109	-	-	-	-	29,389
Park Service	78,832	-	78,832	-	-	-	-	-	78,832	78,832	-	74,908	-	-	-	-	3,924
Total - -	701,175	-	701,175	45,505	174,020	-	335,924	-	145,726	481,650	83,785	531,886	-	-	-	1,968	83,536
OREGON:																	
Bureau - EQ	57,900	-	57,900	8,559	-	-	49,341	-	-	49,341	7,079	47,388	-	-	-	-	3,433
Forest Service	562	-	562	-	-	-	-	-	562	562	-	562	-	-	-	-	-
Park Service	225	-	225	-	-	-	-	-	225	225	-	225	-	-	-	-	-
O & C	5,463	-	5,463	-	-	-	-	-	5,463	5,463	1,656	3,588	-	-	-	-	219
State - NYA	528	-	528	-	-	-	528	-	-	528	-	-	-	$528	-	-	-
Total - -	64,678	-	64,678	8,559	-	-	49,869	-	6,250	56,119	8,735	51,763	-	528	-	-	3,652
Regional Totals -	$765,853	-	$765,853	$54,064	$174,020	-	$385,793	-	$151,976	$537,769	$92,520	$583,649	-	$528	-	$1,968	$87,188

TABLE 4A

SUMMARY OF ALL EXPENDITURES, 1918*-1940 (INCLUSIVE)

State	Total			Recapitulation by Programs												
				Regular	Emergency					By Activities (Federal and State)						
	Federal (All Agencies Including State WPA Projects)	State (Includes All Cooperative Funds)	Grand Total	Federal and State Cooperative	Federal WPA, CWA, ERA, NYA	State WPA	ECW, SCS	PWA	Total Emergency Programs	Supervision (Includes State and District Leaders)	Ribes Eradication	Cultivated Black Currant Eradication	Nursery Sanitation	Canker Elimination	Pre-eradication Survey	All Other - (Checking, Field Data, and Miscellaneous)
California	$4,329,104	-	$4,329,104	$1,243,200	$2,302,768	-	$386,698	$396,438	$3,085,904	$598,366	$3,031,285	$39,905	$ 1,316	-	$53,126	$605,106
Oregon	843,836	-	843,836	254,394	472,455	$20,666	6,814	89,507	589,442	61,264	555,033	36,895	16,364	$2,268	19,968	152,044
Regional Total - -	$5,172,940	-	$5,172,940	$1,497,594	$2,775,223	$20,666	$393,512	$485,945	$3,675,346	$659,630	$3,586,318	$76,800	$17,680	$2,268	$73,094	$757,150

*No expenditures prior to 1923, inasmuch as work in California and Oregon was not initiated until that year.

TABLE 4B

STATUS OF BLISTER RUST CONTROL 1918-1940 INCLUSIVE

State	Acres			Number 8-Hour Man Days	Number Ribes Destroyed (Wild and Cultivated)	Acres	
	Control Area Including Border Zones	Net Control Area Initially Protected	Control Areas Reworked Subsequent to Initial Protection			Remaining Control Area Needing Initial Protection	Estimated Protected Area Now on Maintenance Basis
California	2,203,204	617,192	*263,145	615,900	123,128,715	1,586,012	233,414
Oregon	526,493	210,906	* 33,090	74,187	18,425,039	315,587	107,796
Mt. Hood Unit Abandoned**	-	2,649	1,766	2,988	552,148	-	-
Total - -	2,729,697	828,098	296,235	690,087	141,553,754	1,901,599	341,210

* Includes all reeradication acreage.
** See footnote Table 1A (Omnibus) page 18.

TABLE 5

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIP 1940

Land Ownership	Initial Eradication			Reeradication			Totals		
	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
National Forest	17,955	4,212,426	25,287	41,050	3,268,504	25,112	59,005	7,480,930	50,399
O & C Revested Lands	3,315	156,154	2,189	-	-	-	3,315	156,154	2,189
Other Public Domain	-	-	-	-	-	-	-	-	-
National Parks	18,164	3,727,985	30,973	1,993	1,286,906	6,632	20,157	5,014,891	37,605
Indian Reservations	-	-	-	-	-	-	-	-	-
Subtotal Federal -	39,434	8,096,565	58,449	43,043	4,555,410	31,744	82,477	12,651,975	90,193
State and Private	11,062	1,388,716	10,382	63,189	4,662,020	41,704	74,251	6,050,736	52,086
Grand Total - - -	50,496	9,485,281	68,831	106,232	9,217,430	73,448	156,728	18,702,711	142,279
NATIONAL FORESTS									
Lassen	135	22,667	135	-	-	-	135	22,667	135
Plumas	6,341	888,793	8,603	18,292	1,101,888	11,552	24,633	1,990,681	20,155
Eldorado	4,450	1,047,856	2,725	12,991	504,924	8,268	17,441	1,552,780	10,993
Stanislaus	1,070	288,089	761	5,630	1,147,033	3,084	6,700	1,435,122	3,845
Sierra	1,254	1,436,000	7,668	4,010	495,184	2,046	5,264	1,931,184	9,714
California Total -	13,250	3,683,405	19,892	40,923	3,249,029	24,950	54,173	6,932,434	44,842
Klamath	3,739	419,719	4,607	-	-	-	3,739	419,719	4,607
Siskiyou	808	104,335	752	-	-	-	808	104,335	752
Siuslaw	158	4,967	36	127	19,475	162	285	24,442	198
Oregon Totals -	4,705	529,021	5,395	127	19,475	162	4,832	548,496	5,557
Total - - - -	17,955	4,212,426	25,287	41,050	3,268,504	25,112	59,005	7,480,930	50,399
NATIONAL PARKS									
Crater Lake	2,487	10,249	36	350	13,430	81	2,837	23,679	117
Lassen Volcanic	3,395	379,739	2,013	-	-	-	3,395	379,739	2,013
Yosemite	11,501	3,058,397	26,981	1,643	1,273,476	6,551	13,144	4,331,873	33,532
Kings Canyon *	781	279,600	1,943	-	-	-	781	279,600	1,943
Total - - - -	18,164	3,727,985	30,973	1,993	1,286,906	6,632	20,157	5,014,891	37,605
STATE AND PRIVATE LANDS									
California	7,647	1,254,903	7,786	63,189	4,662,020	41,704	70,836	5,916,923	49,490
Oregon	3,415	133,813	2,596	-	-	-	3,415	133,813	2,596
Total - - - -	11,062	1,388,716	10,382	63,189	4,662,020	41,704	74,251	6,050,736	52,086

*Formerly known as General Grant National Park

TABLE 5A

SUMMARY OF RIBES ERADICATION BY LAND OWNERSHIPS 1918-1940 INCLUSIVE

Land Ownership	Total Acreage of White Pine Worth Protection	Control Areas		Initial Eradication			Reeradication Work			Totals (Initial and Rework)		
		Total Acreage (White Pine and Protective Zones)	Acreage Not Yet Worked Initially	Net Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
National Forests	1,213,767	1,213,767	875,165	338,602	59,465,170	244,010	164,766	14,201,487	83,998	503,368	73,666,657	328,008
O & C Revested Lands	139,669	139,669	112,720	26,949	454,781	6,273	-	-	-	26,949	454,781	6,273
Other Public Domain	-	-	-	-	-	-	-	-	-	-	-	-
National Parks	226,304	226,304	170,285	56,019	9,804,796	76,688	7,736	1,919,700	11,277	63,755	11,724,496	87,965
Indian Reservations	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal Federal -	1,579,740	1,579,740	1,158,170	421,570	69,724,747	326,971	172,502	16,121,187	95,275	594,072	85,845,934	422,246
State and Private	1,149,957	1,149,957	743,429	406,528	48,737,318	200,285	123,733	6,970,502	67,556	530,261	55,707,820	267,841
Grand Total - - -	2,729,697	2,729,697	1,901,599	828,098	118,462,065	527,256	296,235	23,091,689	162,831	1,124,333	141,553,754	690,087

Land Ownership	Total Acreage of White Pine	Control Areas		Initial Eradication			Reeradication Work			Totals (Initial and Rework)		
		Total Acreage (White Pine and Protective Zones)	Acreage Not Yet Worked Initially	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days	Acreage Worked	Number Ribes Destroyed	Number 8-Hour Man Days
NATIONAL FORESTS												
Lassen				7,376	565,337	3,493	1,339	9,462	375	8,715	574,799	3,868
Plumas				67,051	8,226,783	43,113	35,354	1,884,456	21,395	102,405	10,111,239	64,508
Eldorado				63,988	9,363,878	31,585	31,797	1,268,166	20,032	95,785	10,632,044	51,617
Stanislaus				76,869	8,014,897	32,259	56,050	4,690,768	24,535	132,919	12,705,665	56,794
Sierra				46,411	18,057,975	87,683	19,064	5,551,747	11,769	65,475	23,609,722	99,452
California Total -	998,768	998,768	737,073	261,695	44,228,870	198,133	143,604	13,404,599	78,106	405,299	57,633,469	276,239
Klamath				3,739	419,719	4,607	-	-	-	3,739	419,719	4,607
Rogue River				65,155	14,496,200	38,574	20,950	766,931	5,664	86,105	15,263,131	44,238
Siskiyou				7,333	195,637	2,323	-	-	-	7,333	195,637	2,323
Siuslaw				680	124,744	373	212	29,957	228	892	154,701	601
Oregon Totals -	214,999	214,999	138,092	76,907	15,236,300	45,877	21,162	796,888	5,892	98,069	16,033,188	51,769
Total - - - -	1,213,767	1,213,767	875,164	338,602	59,465,170	244,010	164,766	14,201,487	83,998	503,368	73,666,657	328,008
NATIONAL PARKS												
Crater Lake	3,782	3,782	150	3,632	130,162	412	350	13,430	81	3,982	143,592	493
Lassen Volcanic	17,792	17,792	4,042	13,750	700,361	5,215	-	-	-	13,750	700,361	5,215
Yosemite	120,620	120,620	89,880	30,740	7,507,179	60,940	7,386	1,906,270	11,196	38,126	9,413,449	72,136
Kings Canyon *	12,830	12,830	9,589	3,241	836,010	5,132	-	-	-	3,241	836,010	5,132
Sequoia	71,280	71,280	66,624	4,656	631,084	4,989	-	-	-	4,656	631,084	4,989
Total - - - -	226,304	226,304	170,285	56,019	9,804,796	76,688	7,736	1,919,700	11,277	63,755	11,724,496	87,965
STATE AND PRIVATE LANDS												
California	981,914	981,914	678,804	303,110	47,042,305	186,118	112,155	6,872,037	66,071	415,265	53,914,342	252,189
Oregon	168,043	168,043	64,625	103,418	1,695,013	14,167	11,578	98,465	1,485	114,996	1,793,478	15,652
Total - - - -	1,149,957	1,149,957	743,429	406,528	48,737,318	200,285	123,733	6,970,502	67,556	530,261	55,707,820	267,841

*Formerly known as General Grant National Park

TABLE 6

SUMMARY OF RIBES ERADICATION WORK ON NATIONAL FOREST LANDS, 1932-1940 INCLUSIVE

Sugar Pine Region	Acreage of National Forest Land in Control Area	Calendar Year	Acreage Worked by - Forest Service First Working	Forest Service Second Working	Forest Service Additional Rework	Forest Service Totals	Bureau First Working	Bureau Second Working	Bureau Additional Rework	Bureau Totals	O & C First Working	Total Acreage Worked by All Agencies First Working	Second Working	Additional Rework	Totals	Total Acreage According to Present Ownership (Initial Erad.)	Unworked Acreage
CALIFORNIA:																	
National Forests-		Up to -															
Eldorado	998,768	1932	-	-	-	-	11,318	6,675	-	17,993	-	11,318	6,675	-	17,993		
Klamath		1933	16,343	1,660	4,213	22,216	-	-	-	-	-	16,343	1,660	4,213	22,216		
Lassen		1934	94,153	1,455	-	95,608	-	-	-	-	-	94,153	1,455	-	95,608		
Mendocino		1935	-	-	-	-	30,435	1,135	-	31,570	-	30,435	1,135	-	31,570		
Plumas		1936	-	-	-	-	44,144	9,927	19	54,090	-	44,144	9,927	19	54,090		
Sequoia		1937	8,847	2,480	-	11,327	5,970	3,508	4,554	14,032	-	14,817	5,988	4,554	25,359		
Shasta		1938	10,153	17,175	1,871	29,199	4,414	1,602	-	6,016	-	14,567	18,777	1,871	35,215		
Sierra		1939	6,118	45,113	1,294	52,525	16,550	-	-	16,550	-	22,668	45,113	1,294	69,075		
Stanislaus		1940	12,810	28,976	1,461	43,247	440	9,548	938	10,926	-	13,250	38,524	2,399	54,173	261,695	737,073
Tahoe																	
Trinity		Total -	148,424	96,859	8,839	254,122	113,271	32,395	5,511	151,177	-	261,695	129,254	14,350	405,299		
OREGON:		Up to -															
National Forests-	214,999	1932	-	-	-	-	2,948	670	-	3,618	-	2,948	670	-	3,618		
Klamath		1933	-	-	-	-	5,953	129	-	6,082	-	5,953	129	-	6,082		
Rogue River		1934	480	-	-	480	8,608	1,258	244	10,110	-	9,088	1,258	244	10,590		
Siskiyou		1935	-	-	-	-	10,765	6,465	-	17,230	-	10,765	6,465	-	17,230		
Siuslaw (Mt. Hebo		1936	42	85	-	127	12,030	-	-	12,030	-	12,072	85	-	12,157		
Plantation only)		1937	-	-	-	-	1,231	8,619	-	9,850	-	1,231	8,619	-	9,850		
Umpqua		1938	-	-	-	-	16,784	4,817	-	21,601	-	16,784	4,817	-	21,601		
		1939	-	-	-	-	*15,970	-	474	16,444	-	15,970	-	474	16,444		
		1940	158	42	85	285	3,876	-	-	3,876	671	4,705	42	85	4,832	76,907	138,092
		Total -	680	127	85	892	78,165	21,958	718	100,841	671	79,516	22,085	803	102,404		
Total - - - -	1,213,767	-	149,104	96,986	8,924	255,014	191,436	54,353	6,229	252,018	671	341,211	151,339	15,153	507,703	338,602	875,165

* Includes 5,535 acres of Federal lands worked by the State of Oregon WPA Project.

PART II

RIBES ERADICATION

By

Roy Blomstrom and Conrad P. Wessela
Associate Foresters

INTRODUCTION

The 1940 Ribes eradication project in California was a continuation of the yearly program and was conducted as a coordinated project by three Federal agencies, the U. S. Forest Service, the National Park Service, and the Bureau of Entomology and Plant Quarantine. The field work was financed through an allocation of ERA, CCC, and Forest Service regular funds. Control work was performed on five National Forests and three National Parks.

Ribes eradication in Oregon during 1940 was conducted on the Klamath and Siskiyou National Forests, Crater Lake National Park, the Oregon State Clark-McNary Forest Nursery within the McDonald State Forest, and on the Mt. Hebo Eastern White Pine Plantation within the Siuslaw National Forest. Agencies engaged in this program were the Bureau of Entomology and Plant Quarantine, U. S. Forest Service, Oregon and California Revested Lands Administration, National Park Service, and the Oregon State College School of Forestry. The work on these five operations was financed through allotments of ERA, CCC, and NYA funds.

In the Sugar Pine Region at the close of the 1940 field season, initial eradication of Ribes had been completed on 828,098 acres and reeradication on 296,235 acres. The maximum employment at the peak of the field season was 2,850 men, of whom 1,290 were employed in accordance with WPA regulations. Of the remaining 1,560 men, 1,320 were CCC enrollees, 230 were hired with regular funds of the Forest Service, and 10 were NYA men employed on the Clark-McNary Forest Nursery on the McDonald State Forest in Oregon. During the season 40 camps were in operation, of which 16 were ERA, 16 CCC, 1 NYA, and the remaining 7 Forest Service regular camps.

ORGANIZATION AND ADMINISTRATION

California

The Bureau Operation

The Bureau operation consisted of six ERA camps, ranging in size from 100 to 130 men. The camps were located on areas most in need of reeradication; two were on the Plumas, two on the Eldorado, and two on the Stanislaus National Forest. The Bureau maintained headquarters at each of the respective Forest Supervisor's headquarters, and the service and supply of its camps and the Forest Service camps was conducted on a cooperative basis.

Camp construction was started late in April, and by the 15th of May all camps were fully manned. At one time during the season approximately 700 men were employed on eradication work. One camp on the Stanislaus National Forest operated until October 20; the other five camps closed during the last week of September and the first week of October.

During the season 30,017 man days were expended eradicating 3,654,128 Ribes from 49,936 acres of sugar pine type. Eradication of Ribes from areas worked initially in 1934, 1935, 1936, and 1937 formed 97 percent of the work.

Forest Service Operation

The Forest Service operated 21 camps; six were CCC, eight ERA, and the remaining seven were regular fund camps. At one time during the season approximately 1,200 men were employed on eradication. Two camps were located on the Lassen, nine on the Plumas, six on the Eldorado, two on the Stanislaus, and two on the Sierra National Forest. They were administered by a Forest Service blister rust staff officer through the regular channels of the Forest Supervisor's office.

The Forest Service ERA program was confined to the Plumas and the Eldorado National Forests, and prior to July 1, when a curtailment of funds made it necessary to close two camps on the Plumas National Forest, the project consisted of eight camps. Four 50-man camps were located on the Eldorado and one 50- and three 100-man camps were located on the Plumas National Forest. The camps were fully manned by May 15, and except for the layoff from July 1 to 13 when new appropriations were delayed, continued

to operate until September 10 to 20.

Both the Bureau and Forest Service ERA camps were run in accordance with WPA regulations. Camp foremen and chief cooks were employed under a WPA supervisory assignment. Requests for men were routed through the State WPA office in San Francisco. The men assigned to the project were assembled by the WPA at transient camps near the various operations and then transported to the camps by the work agency.

Prior to July 15 the men in the ERA camps were paid on an hourly basis, and limited to 130 hours of work per month. Effective July 16 this was changed from the monthly basis to a four-week fiscal basis. Under this procedure the pay period consisted of 14 days and a normal working time of 60 hours per period. The hourly rates for security wage workers remained the same, but were based upon 120 hours per fiscal period. The monthly rates for project supervisory employees were likewise changed to conform with the new fiscal period.

The first of the following tabulations gives the number of initial assignments, reassignments, and number of men assigned but did not report for work for the Bureau's operation in California. The second table shows for the same group of men the employment record by months. It is interesting to note that out of 1,711 men assigned to the project, 857 or 50 percent stayed less than one month.

- ASSIGNMENT RECORD -

Operation	Number of Initial Assignments	Number of Reassignments	Number of Transfers	Total Number of Assignments	Number Assigned but did not Report
Plumas	469	28	5	502	60
Eldorado	622	55	5	682	142
Stanislaus	473	42	5	520	111
Scouting	2	-	5	7	-
Total - -	1,566	125	20	1,711	313

- EMPLOYMENT RECORD BY MONTHS -

Operation	Less than 1 month	MONTHS						
		1 - 2	2 - 3	3 - 4	4 - 5	5 - 6	6 - 7	7 - 8
Plumas	230	131	43	45	17	32	4	-
Eldorado	388	151	63	35	22	16	6	1
Stanislaus	239	178	36	34	17	9	7	-
Scouting	-	-	-	-	-	5	2	-
Total - -	857	460	142	114	56	62	19	1

The Forest Service CCC program consisted of four full camps and two part camps. Two camps were located on the Lassen National Forest and one each on the Plumas, Eldorado, Stanislaus, and Sierra National Forests. The camps opened from May 10 to June 15 and continued to operate until October, when working conditions became unfavorable.

The regular fund program continued on the same scale as in 1939. Seven 33-man camps were in operation from early May until the latter part of September; four of these were located on the Plumas and one on each of the Eldorado, Stanislaus, and Sierra National Forests. Eradication of Ribes from areas worked initially in 1935, 1936, and 1937 formed 91 percent of the work. Wages, hours of work per week, sick and annual leave privileges, and board deductions remained the same as in 1939.

The labor secured for the regular fund camps was superior to that employed in 1939 for the following reasons: (1) a nucleus of experienced men was available from the past season; (2) because of the early season program it was possible to compete with other woods industries in selecting the best type of labor; (3) considerable time was spent in checking available labor sources and selecting only highly qualified men; and (4) as highly recommended college students proved satisfactory in 1939, more were employed in 1940.

National Park Service

The National Park Service program was conducted on three National Parks with CCC enrollees from eight camps. During July at the peak of the season 650 men were employed.

Seventy-five men from two camps performed Ribes eradication work from approximately July 15 to September 15 on the Manzanita Lake and White Mountain units of Lassen Volcanic National Park. On Yosemite National Park 125 enrollees from two camps began Ribes eradication late in April, and continued operating until late October; an additional 410 enrollees operating from three camps began eradication work during July and closed early in October. The work on Kings Canyon National Park was a continuation of the work started in 1938 on the General Grant Grove Section and consisted of initial eradication by 40 enrollees from the Cedar Grove CCC camp. The work started early in July and terminated in October.

As in the past years the project was administered by representatives from the respective Park Superintendent offices. Eugene I. Barton, Chief Ranger, represented the Park Service on the Lassen Volcanic National Park; Emil F. Ernst, Park Forester, administered the work on the Yosemite National Park; and Kenneth Flewelling, blister rust foreman, handled the work on Kings Canyon National Park. Technical advisors from the Bureau of Entomology and Plant Quarantine assisted with working plans, determining control standards, and other technical phases of the work.

Oregon

The Bureau Operation

The Bureau maintained headquarters for Oregon operations at Medford, Oregon, from which its camps were serviced with supplies. The Bureau employed an technical supervisor and a checking supervisor to supervise its own Ribes eradication program, to coordinate the work of the cooperating agencies, and to give technical assistance to them in the operation of their control programs.

Until July 1, two 100-man ERA camps were maintained through an allotment of Emergency Relief funds. One camp was located on the Klamath National Forest and one on the Siskiyou National Forest. From July 1 to 27 all Bureau sponsored ERA work was held in abeyance because of delay in the processing of a Federal agency WPA blister rust control project at the beginning of the 1940-1941 fiscal year. When operations were resumed, the camp on the Siskiyou National Forest was discontinued owing to insufficient funds and insufficient qualified relief labor. The Klamath camp was continued until October 5.

Operation of the Oregon and California Revested Lands Administration

In June, the Oregon and California Revested Lands Administration established a 50-man CCC spike camp on the Siskiyou National Forest to conduct control work on lands under their jurisdiction and adjacent to areas previously worked by the Bureau. One senior foreman and one junior foreman were employed by the Oregon and California Revested Lands Administration to manage the camp and eradication work. The camp was serviced with supplies from the main camp located near Williams Creek, Oregon. Eradication work ceased on October 15.

National Park Service Operation

On July 31, the National Park Service assigned twenty CCC enrollees and a senior foreman from the Annie Creek CCC Camp to Ribes eradication work on the Cloud Cap Unit of Crater Lake National Park. Advance, post, and regular checking were conducted by Bureau employees who also gave general supervision. The eradication job was completed late in September.

Forest Service Operation

Control work by the Forest Service was limited to the Mt. Hebo Eastern White Pine Plantation on the Siuslaw National Forest. A spike camp was established near the job and twenty CCC boys and a foreman from Camp Nestucca began work in June and finished the job on July 18. Checking and general supervision were furnished by the Bureau.

State NYA Operation

To protect two small white pine plantings and to place the Oregon State Clark-McNary Forest Nursery in a sanitary condition for the propagation of five-needled pine, control work was started in June on a 880-acre area by the Oregon State College School of Forestry. A group of students

from the NYA camp located within the area was employed intermittently throughout the summer until September 20. Funds for the work were furnished by the National Youth Administration. Technical supervision and all checking work was done by Bureau employees, and immediate supervision was given by the Forestry School professors and advanced students.

LOCATION AND DESCRIPTION OF AREAS

California

The distribution of camps throughout the forests was dependent upon several factors:

(1) Control units in need of reeradication were given first priority.
(2) Initial eradication was confined to areas supporting a good stand of mature sugar pine and reproduction having heavy Ribes concentrations, and situated in proximity to the rust.
(3) Regular fund camps were largely confined to reeradication.
(4) Existing locations of CCC camps within control areas were again utilized.

Maps of each operation accompany this report and show in detail areas worked prior to 1940, reeradication and initial areas worked during 1940, and the portion remaining to be worked.

On the Eldorado National Forest control work was initiated on a new unit, established for recreational values along the American River and U. S. Highway 50. The unit is rectangular in shape and extends approximately one mile on each side of the river and highway for a distance of six miles. Numerous summer homes, camp grounds, and one summer resort are situated upon the unit adjacent to the river, and much of their scenic and aesthetic value is dependent upon the surrounding mature sugar pine.

The White Mountain Unit on Lassen Volcanic National Park was the only other new unit upon which control measures were started. This unit comprises an area of approximately 6,000 acres and supports a stand of _Pinus monticola_ and _P. albicaulis_, valuable for aesthetic and recreational purposes. This special use area is traversed by the Mt. Lassen Loop Highway and by several well used trails. The terrain is steep and rugged with numerous talus slopes and cliffs. _Ribes montigenum_ is the principal Ribes species, and is often found growing in close association with alder and willows adjacent to the numerous mountain meadows.

A description of the other control units upon which work was performed will be found in previous annual reports.

Oregon

Klamath National Forest

The State line between Oregon and California bisects the Beaver Creek Control Unit, leaving approximately 15,000 acres in the headwaters of Cottonwood and Grouse Creeks on the Oregon side of the State line. Initial eradication work was started in this area in 1940.

Practically all the Beaver Creek Unit was logged from eight to twenty years ago, yet natural restocking of sugar pine, ponderosa pine, Douglas fir, true fir, and incense cedar is, for the most part, adequate for a well-stocked future forest.

The topography is steep and rugged, typical of the Siskiyou Mountains, but old logging roads and railroad grades made nearly all areas readily accessible to eradication crews. Working conditions are difficult in the stream type and on north- to east-facing slopes. *Ribes lacustre* and large *R. sanguineum* are numerous and grow in close association with other vegetation and logging debris. Other species of Ribes found were *R. lobbii*, *R. cruentum*, *R. viscosissimum*, *R. binominatum*, and *R. cereum*.

This year, several incipient blister rust cankers were found on sugar pine trees within control units on the Klamath National Forest. Since slightly over 100 Ribes per acre, rather evenly distributed and growing closely associated with sugar pines, occur on these units, considerable damage may be expected within a few years unless a vigorous control program is initiated in 1941. Few seed trees were left after logging, and the loss of the advance sugar pine reproduction will mean the end of natural regeneration of sugar pine.

Siskiyou National Forest

Work on the Siskiyou National Forest was confined to initial eradication in the vicinity of Swede Basin adjoining the area worked in 1939. Work of the Bureau ERA camp and of the O & C - CCC Spike Camp was kept contiguous.

The major portion of the area covered had been logged, was very steep and brushy, and somewhat inaccessible to eradication crews working from road camps. A peculiar circumstance is that practically no Ribes grow in the stream type in this area; Ribes are largely confined to rocky outcrops and bottoms of dry draws.

Crater Lake National Park

That portion of the Cloud Cap Unit which was covered initially in 1937 was given a second working. In 1937 on initial eradication, 98,348 individual *Ribes erythrocarpum* plants were removed. On the second working this year of the same area, only 11,783 plants were removed. Little regeneration from seed was noted; nearly all regeneration came from crowns and pieces of stolons left in the ground during the first working.

In addition, initial eradication was performed on a 2,487-acre extension to the original unit. This additional area adjoins the eastern

boundary of the unit established in 1937 and extends eastward to the Park boundary. It is bounded on the north by Scotts Bluffs and on the south by the extension to the east of the original unit boundary. White bark pine constitutes 50 percent of the timber stand; the remainder is composed of lodgepole pine, mountain hemlock, and true firs. Ribes are very light; all but 70 acres of the 2,487 acres blocked out as Ribes-free.

Mt. Hebo Eastern White Pine Plantation

This plantation has been described in previous annual reports. The control unit was originally laid out in 1934 in an approximate circle enclosing 522 acres. All but 42 acres were given an initial working that year. In 1936, the area worked initially in 1934 was given a second working and the remaining 42 acres of the original unit a first working. In 1940 all area worked previously was reeradicated of Ribes and in addition the original unit of 522 acres was enlarged by 158 acres for convenience in establishing permanent unit boundaries and to secure an added margin of safety in the protection of the planted pine.

Ribes bracteosum is the only Ribes present on the unit and since this is a favorable Ribes site considerable regeneration of this species had occurred since the original working. Several more workings may be necessary before the Ribes on the stream type will be permanently suppressed.

Oregon State Clark-McNary Forest Nursery

This forest nursery is located within the McDonald State Forest near Corvallis, Oregon. Near the nursery are two small plantings of western white pine. An 880 acre rectangular shaped control area was established to provide for the growing of five-needled pine stock in the nursery and to protect the plantings from more infection. Many of the planted pines were seriously infected with blister rust at the beginning of initial Ribes eradication this year. Visible branch cankers were removed and trees with low trunk cankers were cut. More cankers will undoubtedly appear for a year or so as incipient cankers develop. These should be pruned out immediately. Some trees were so heavily infected that pruning of infected branches almost defoliated them, and a number of these trees may die or their growth be drastically retarded for a number of years.

Ribes sanguineum was found to be generally distributed over the upland. On the stream type R. lacustre and R. inerme were found. Eradication of R. sanguineum was especially difficult and troublesome because of a dense ground cover of poison oak, and only men with some native immunity to poison oak could be employed.

METHODS OF WORK

Standard eradication practices modified to meet existing field conditions were used throughout the Region.

A large-scale experiment was conducted to determine the advantages and disadvantages of running advance string in different eradication types and with different classes of labor. Whenever working conditions would warrant the work of four camps, two on the Plumas and one each on the Eldorado and Stanislaus National Forests, was laid out in quarter-section blocks, and alternate blocks were worked by laying advance string. Approximately 18,000 acres were covered on the experiment. A detailed summary of this experiment will form the basis of a special report by the Methods Office.

Claw mattock eradication tools were given a comprehensive test this summer and proved satisfactory. On reeradication where the bushes often grow with only a single tap root, the forked tools were especially effective. In rocky terrain or shale their effectiveness was reduced.

The mechanical eradication of Ribes with a small tractor equipped with a single drum winch and grapple plow was confined to a small area of especially heavy concentrations of _Ribes roezli_ on the Sierra National Forest.

The tractor, which is equipped with a special bulldozer Ribes rake, was used almost exclusively to make lanes through dense brush fields supporting numerous Ribes. The lanes were located to avoid damaging any advance reproduction. Stripping the brush fields enabled the crews to cover the area more rapidly and effectively, dispose of the Ribes more easily and helped maintain a better morale among the CCC enrollees.

Blasting with 20 percent stumping powder was used extensively in Yosemite National Park in removing extremely large _Ribes nevadense_ bushes and proved to be effective along streams where the bushes grew in close association with stream type vegetation and logging debris.

Decapitation of rockbound Ribes and the treatment of exposed crowns was used again this year on Lassen Volcanic National Park. Approximately 160 acres were covered by this method.

A full report of these supplementary methods of eradication will be found in the methods section of this report.

Standard hand eradication methods supplemented by the decapitation and chemical treatment method were employed on all Oregon operations. With CCC labor some four- or five-man crews were used, but with all other types of labor three-man crews were employed.

On the Klamath and Siskiyou operations the decapitation and chemical treatment with a mixture of borax and sodium chlorate was used extensively. This supplementary hand eradication method was most useful on the Siskiyou operation where a large percentage of _R. cruentum_ was rockbound.

On the Klamath operation, the claw mattock eradication tool was given a thorough trial and proved to be very effective. As a result of these trials, it has been decided that this tool is, for Oregon conditions, the best all-around Ribes eradication tool yet developed. In very rocky sites, the standard pick mattock is more effective, but for average conditions within southern Oregon control units, the claw mattock should prove more effective.

RESULTS

The reeradication program for 1940 conducted on four national forests and one national park was the largest of any to date. A total of 115,121 acres were inspected on second eradication during 1940: 101,976 acres were covered by crews, and 13,145 acres were eliminated from crew work by post check and placed on maintenance.

In order to compare second Ribes eradication with initial eradication on the same area a thorough analysis was made of the changes that occur in Ribes population classes following initial eradication. The data secured consist of two parts, (1) a general summary of acres in Ribes population classes at first working compared with those present just prior to second eradication, and (2) a detailed analysis showing for each population class the redistribution of that class into other population classes as a result of initial eradication. This redistribution depicts the area just before second eradication.

These data were compiled for approximately 108,000 acres of the area covered on second eradication in 1940. Approximately 100,000 acres were covered by crews, and 8,000 acres eliminated from crew work by post check. The remaining 7,000 acres covered on second eradication were eliminated from this study because of incomplete data.

To standardize the method of securing these data, a gridiron form consisting of 64 one-inch squares was used for recording the data. Each square represented a 10-acre block, and hence the entire form represented a section of 640 acres. The Ribes population classes for initial eradication were secured by ten acre blocks from advance check and Ribes concentration maps, and recorded in the corresponding block on the section form. Following the posting of the initial population classes, the Ribes concentrations just before second eradication were obtained by 10-acre blocks from post check maps and recorded with the corresponding data for initial working. By this method of obtaining and recording Ribes population classes just prior to initial and second eradication, it was possible to show the changes that occur in each population class as a result of initial eradication.

The area included in this analysis was worked initially in 1934, 1935, and 1936; approximately 80,000 acres was in the timber type classification and 27,000 in the cut-over type classification. The summarized results are shown in tabular and graphic form.

ACREAGE CHANGES IN RIBES POPULATION CLASSES RESULTING FROM INITIAL ERADICATION

Status of Area	Ribes Population Classes											
	Class No. 1		Class No. 2		Class No. 3		Class No. 4		Class No. 5		All Classes	
	Acres 0-25 FLS Per Acre	Per-cent of Total Area	Acres 25 FLS to 30 Bushes Per Acre	Per-cent of Total Area	Acres 31-150 Bushes Per Acre	Per-cent of Total Area	Acres 151-1,000 Bushes Per Acre	Per-cent of Total Area	Acres Over 1,000 Bushes Per Acre	Per-cent of Total Area	Acres	Percent
Prior to Initial Eradication	8,243	7.6	37,972	35.2	35,107	32.5	22,610	21.0	3,964	3.7	107,896	100.0
Prior to Second Eradication	48,204	44.7	38,025	35.3	19,134	17.7	2,513	2.3	20	-	107,896	100.0

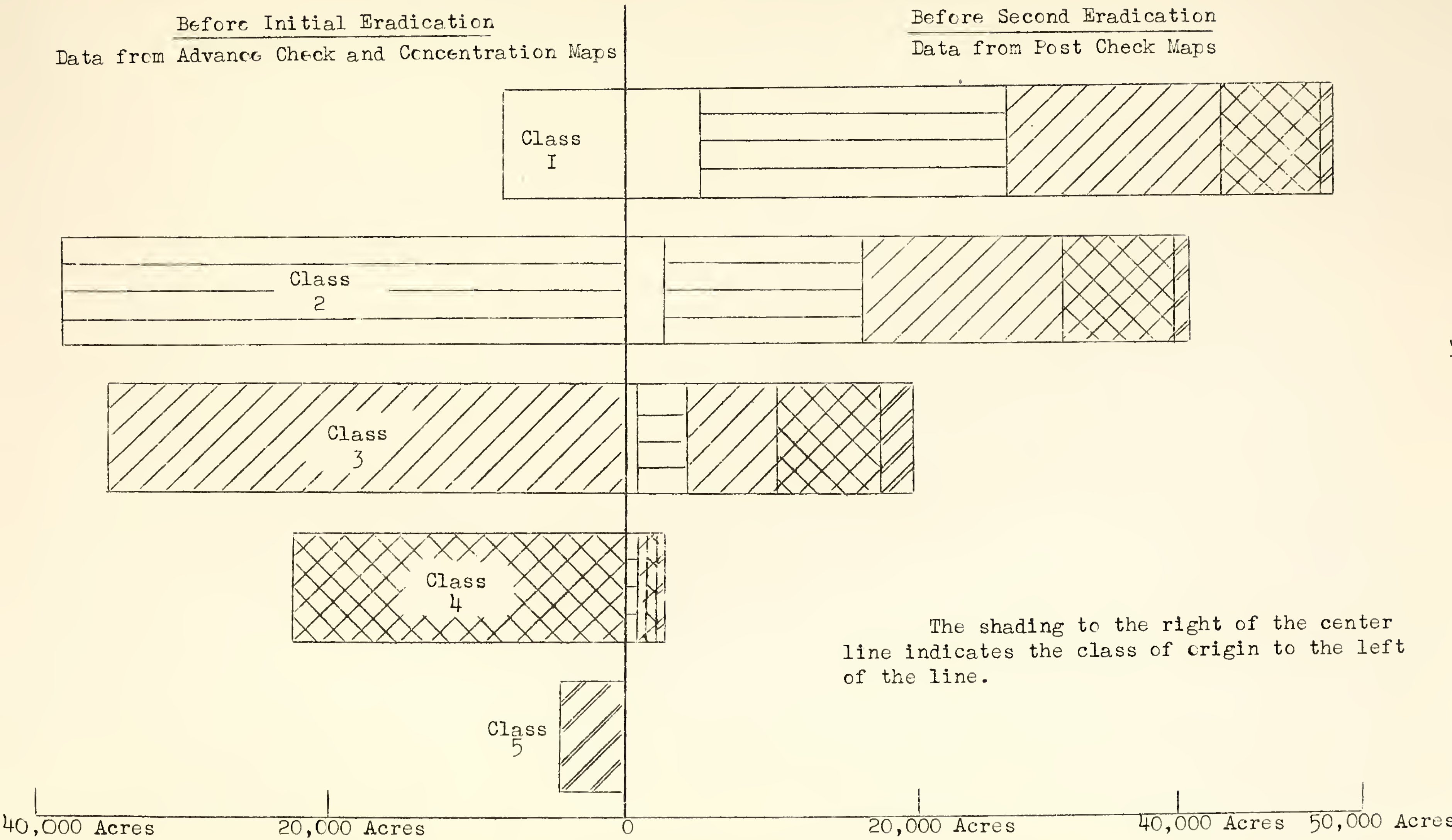
THE COMPOSITION OF RIBES POPULATION CLASSES BEFORE SECOND ERADICATION
ACCORDING TO CLASS OF ORIGIN

Population Class	Acreage of each Population Class at Time of Initial Eradication	Percent of Total Area	Population Classes Before Second Eradication Showing Composition by Class of Origin									
			Class No. 1		Class No. 2		Class No. 3		Class No. 4		Class No. 5	
			Acres	Percent of Original Area*	Acres	Percent of Original Area*	Acres	Percent of Original Area*	Acres	Percent of Original Area*	Acres	Percent of Original Area*
#1	8,243	7.6	5,253	63.8	2,595	31.5	370	4.5	20	0.2	-	-
#2	37,972	35.2	21,030	55.4	13,121	34.5	3,591	9.5	230	0.6	-	-
#3	35,107	32.5	14,752	42.0	13,819	39.4	6,077	17.3	459	1.3	-	-
#4	22,610	21.0	6,704	29.7	7,580	33.5	7,288	32.2	1,028	4.6	10	-
#5	3,964	3.7	460	11.6	910	23.0	1,808	45.6	776	19.6	10	0.2
Total -	107,896	100.0	48,204	44.7	38,025	35.3	19,134	17.7	2,513	2.3	20	0.0

*As given in column 2.

GRAPH I

CHANGE IN COMPOSITION OF RIBES POPULATION CLASSES



The shading to the right of the center line indicates the class of origin to the left of the line.

An inspection of the tabulation "Acreage Changes in Ribes Population Classes Resulting from Initial Eradication" shows that at the time of initial eradication 7.6 percent was in Class No. 1, 35.2 percent in Class No. 2, and 32.5 percent, 21 percent, and 3.7 percent were in Classes Nos. 3, 4, and 5, respectively. Just prior to second eradication four to six years later the population classes were as follows: Class No. 1, 48,204 acres, or 44.7 percent of the total area; Class No. 2, 35.3 percent, and 17.7, and 2.3 percent for Classes Nos. 3 and 4. The 3,964 acres in Class No. 5 on initial eradication was reduced as the result of initial working to twenty acres.

This tabulation shows the progress made in reducing the Ribes population by one eradication, yet it does not show the changes that occur in each individual population class. For this reason the data available were broken down to show the change that takes place in each population class after initial eradication. The figures are presented in the following table and shown pictorially in the attached graph.

By inspection of the tabulation "The Composition of Ribes Population Classes Before Second Eradication, According to Class of Origin," the changes in each population class are apparent. For example, the 35,107 acres in Class No. 3 at the time of initial eradication changed as follows: 14,752 acres, or 42 percent, dropped to Class No. 1; 13,819 acres, or 39.4 percent, changed to Class No. 2; and 6,077 acres, or 17.3 percent, remained constant, and 1.3 percent reverted to Class No. 4. Similarly the changes for each population class can be followed through the table. These data are also presented pictorially in the attached graph.

Additional study of the table reveals that on initial eradication 42.8 percent of the area was in Classes 1 and 2, that is, supported less than 30 bushes to the acre. After initial eradication 80 percent of the area fell into Classes 1 and 2.

A further analysis reveals that 6.2 percent of the area supported more Ribes just prior to second eradication than on initial working. Twenty-four percent of the population classes remained stationary, 39.7 percent dropped one class; 22.4 percent dropped two classes; 7 percent dropped three classes; and 0.4 percent dropped four classes.

Initial eradication of Ribes was done in 1934, 1935, and 1936 with NIRA, ERA, and CCC crews. The reeradication in 1940 was performed by Forest Service regular crews, ERA, and CCC. Initial eradication required 82,468 eight-hour man days to destroy 25,258,753 Ribes on approximately 108,000 acres of virgin and cut-over timber lands. Second eradication of Ribes from the same area required 59,862 eight-hour man days, or 72.5 percent of the amount expended on initial eradication, to remove 6,659,037 Ribes or 26.4 percent of the amount removed on initial working.

TABLE 1

THE STATUS OF RIBES ERADICATION BY LAND OWNERSHIP IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1940

PART A - California

Control Unit	Class of Ownership	Acreage of Control Units: White and Sugar Pine Type	Acreage of Control Units: Non-White and -Sugar Pine Type	Acreage of Control Units: Total Acreage	Acreage of Control Units: Acreage Unworked	First Working: Acres Worked	First Working: Man Days	First Working: Ribes	Second Working: Acres Worked	Second Working: Man Days	Second Working: Ribes	Third Working: Acres Worked	Third Working: Man Days	Third Working: Ribes	Fourth Working: Acres Worked	Fourth Working: Man Days	Fourth Working: Ribes	Total All Workings: Acres Worked	Total All Workings: Man Days	Total All Workings: Ribes
NATIONAL FORESTS																				
Mendocino National Forest	Federal	16,290	4,727	21,017	21,017															
	Private	12,067	3,112	15,179	15,179															
	State	40	8	48	48															
	Total	28,397	7,847	36,244	36,244															
Trinity National Forest	Federal	107,288	15,287	122,575	122,575															
	Private	37,214	3,069	40,283	40,283															
	State	2,035	53	2,088	2,088															
	Total	146,537	18,409	164,946	164,946															
Klamath National Forest	Federal	24,690	6,615	31,305	31,305															
	Private	27,555	10,980	38,535	38,535															
	Total	52,245	17,595	69,840	69,840															
Shasta National Forest	Federal	2,615	996	3,611	3,611															
	Private	60,970	13,181	74,151	74,151															
	Total	63,585	14,177	77,762	77,762															
Lassen National Forest	Federal	35,634	19,220	54,854	47,478	7,376	3,493	565,337	1,339	375	9,462							8,715	3,868	574,799
	Private	205,080	40,341	245,421	213,150	32,271	18,337	2,398,671	5,010	2,179	200,621							37,281	20,516	2,599,292
	State	480	160	640	640	-	-	-	-	-	-							-	-	-
	Total	241,194	59,721	300,915	261,268	39,647	21,830	2,964,008	6,349	2,554	210,083							45,996	24,384	3,174,091
Plumas National Forest	Federal	150,458	43,211	193,669	126,618	67,051	43,113	8,226,783	33,122	20,157	1,765,015	2,232	1,238	119,441				102,405	64,508	10,111,239
	Private	140,459	28,193	168,652	106,949	61,703	41,515	8,200,924	29,438	19,157	2,234,574	1,006	553	45,338				92,147	61,225	10,480,836
	State	-	322	322	282	40	21	4,620	-	-	-	-	-	-				40	21	4,620
	Total	290,917	71,726	362,643	233,849	128,794	84,649	16,432,327	62,560	39,314	3,999,589	3,238	1,791	164,779				194,592	125,754	20,596,695
Tahoe National Forest	Federal	16,325	3,600	19,925	19,925															
	Private	18,063	1,920	19,983	19,983															
	Total	34,388	5,520	39,908	39,908															
Eldorado National Forest	Federal	86,584	40,040	126,624	62,636	63,988	31,585	9,363,878	30,676	19,435	1,241,428	1,121	597	26,738				95,785	51,617	10,632,044
	Private	110,837	21,398	132,235	55,244	76,991	46,161	12,216,286	29,253	18,231	1,395,447	390	247	7,406				106,634	64,639	13,619,139
	State	2,322	320	2,642	40	2,602	1,634	310,891	-	-	-	-	-	-				2,602	1,634	310,891
	Total	199,743	61,758	261,501	117,920	143,581	79,380	21,891,055	59,929	37,666	2,636,875	1,511	844	34,144				205,021	117,890	24,562,074
Stanislaus National Forest	Federal	72,803	30,025	102,828	25,959	76,869	32,259	8,014,897	45,053	19,147	4,234,781	6,281	3,068	314,812	4,716	2,320	141,175	132,919	56,794	12,705,665
	Private	123,042	16,728	139,770	28,838	110,932	52,545	17,982,684	40,651	23,290	2,501,517	1,680	515	95,657	347	47	1,998	153,610	76,397	20,581,856
	State	320	87	407	-	407	129	16,768	-	-	-	-	-	-	-	-	-	407	129	16,768
	Total	196,165	46,840	*243,005	54,797	*188,208	84,933	26,014,349	85,704	42,437	6,736,298	7,961	3,583	410,469	5,063	2,367	143,173	286,936	133,320	33,304,289
Sierra National Forest	Federal	144,163	134,267	278,430	232,019	46,411	87,683	18,057,975	19,064	11,769	5,551,747							65,475	99,452	23,609,722
	Private	47,980	18,670	66,650	50,494	16,156	24,382	5,708,223	4,165	1,826	384,687							20,321	26,208	6,092,910
	State	10	150	160	160	-	-	-	-	-	-							-	-	-
	Total	192,153	153,087	345,240	282,673	62,567	112,065	23,766,198	23,229	13,595	5,936,434							85,796	125,660	29,702,632
Sequoia National Forest	Federal	19,475	24,455	43,930	43,930															
	Private	9,120	9,760	18,880	18,880															
	Total	28,595	34,215	62,810	62,810															
Total All National Forests	Federal	676,325	322,443	998,768	737,073	261,695	198,133	44,228,870	129,254	70,883	12,802,433	9,634	4,903	460,991	4,716	2,320	141,175	405,299	276,239	57,633,469
	Private	792,387	167,352	959,739	661,686	298,053	182,940	46,506,788	108,517	64,683	6,716,846	3,076	1,315	148,401	347	47	1,998	409,993	248,985	53,374,013
	State	5,207	1,100	6,307	3,258	3,049	1,784	332,279	-	-	-	-	-	-	-	-	-	3,049	1,784	332,279
	Total	1,473,919	490,895	1,964,814	1,402,017	562,797	382,857	91,067,937	237,771	135,566	19,519,279	12,710	6,218	609,392	5,063	2,367	143,173	818,341	527,008	111,339,781
NATIONAL PARKS																				
Lassen Volcanic National Park	Federal	4,972	12,820	17,792	4,042	13,750	5,215	700,361										13,750	5,215	700,361
	Private	-	140	140	-	140	55	14,977										140	55	14,977
	Total	4,972	12,960	17,932	4,042	13,890	5,270	715,338										13,890	5,270	715,338
Yosemite National Park	Federal	77,236	43,384	120,620	89,880	30,740	60,940	7,507,179	7,386	11,196	1,906,270							38,126	72,136	9,413,449
	Private	500	2,010	2,510	2,510	-	-	-	-	-	-							-	-	-
	Total	77,736	45,394	123,130	92,390	30,740	60,940	7,507,179	7,386	11,196	1,906,270							38,126	72,136	9,413,449
Kings Canyon National Park	Federal	8,125	4,705	12,830	9,589	3,241	5,132	836,010										3,241	5,132	836,010
Sequoia National Park	Federal	40,315	30,965	71,280	66,624	4,656	4,989	631,084										4,656	4,989	631,084
Total All National Parks	Federal	130,648	91,874	222,522	170,135	52,387	76,276	9,674,634	7,386	11,196	1,906,270							59,773	87,472	11,580,904
	Private	500	2,150	2,650	2,510	140	55	14,977	-	-	-							140	55	14,977
	Total	131,148	94,024	225,172	172,645	52,527	76,331	9,689,611	7,386	11,196	1,906,270							59,913	87,527	11,595,881
STATE PARKS																				
Latour State Park	Private	1,920	80	2,000	2,000															
	State	4,146	4,979	9,125	9,125															
	Total	6,066	5,059	11,125	11,125															
Calaveras Big Tree State Park	Private	120	-	120	-	120	21	3,260	-	-	-							120	21	3,260
	State	1,618	355	1,973	225	1,748	1,318	185,001	215	26	4,792							1,963	1,344	189,793
	Total	1,738	355	2,093	225	1,868	1,339	188,261	215	26	4,792							2,083	1,365	193,053
Total All State Parks	Private	2,040	80	2,120	2,000	120	21	3,260	-	-	-							120	21	3,260
	State	5,764	5,334	11,098	9,350	1,748	1,318	185,001	215	26	4,792							1,963	1,344	189,793
	Total	7,804	5,414	13,218	11,350	1,868	1,339	188,261	215	26	4,792							2,083	1,365	193,053
TOTAL																				
Total All Control Units	Federal	806,973	414,317	1,221,290	907,208	314,082	274,409	53,903,504	136,640	82,079	14,708,703	9,634	4,903	460,991	4,716	2,320	141,175	465,072	363,711	69,214,373
	Private	794,927	169,582	964,509	666,196	298,313	183,016	46,525,025	108,517	64,683	6,716,846	3,076	1,315	148,401	347	47	1,998	410,253	249,061	53,392,270
	State	10,971	6,434	17,405	12,608	4,797	3,102	517,280	215	26	4,792	-	-	-	-	-	-	5,012	3,128	522,072
	Total	1,612,871	590,333	2,203,204	1,586,012	617,192	460,527	100,945,809	245,372	146,788	21,430,341	12,710	6,218	609,392	5,063	2,367	143,173	880,337	615,900	123,128,715

* Includes 8,206 acres of Private and Federal lands recently acquired by Yosemite National Park.

TABLE 1 (CONTINUED)

THE STATUS OF RIBES ERADICATION BY LAND OWNERSHIP IN THE SUGAR PINE REGION AS OF DECEMBER 31, 1940

PART B - Oregon

Control Unit	Class of Owner-ship*	Acreage of Control Units: White and Sugar Pine Type	Non-White and -Sugar Pine Type	Total Acreage	Acreage Unworked	Status of Eradication: First Working: Acres Worked	Man Days	Ribes	Second Working: Acres Worked	Man Days	Ribes	Third Working: Acres Worked	Man Days	Ribes	Fourth Working: Acres Worked	Man Days	Ribes	Total All Workings: Acres Worked	Man Days	Ribes
NATIONAL FORESTS																				
Klamath National Forest	Federal: National Forest	7,857	1,174	9,031	5,292	3,739	4,607	419,719										3,739	4,607	419,719
	Federal: O & C	3,978	595	4,573	4,573	-	-	-										-	-	-
	Federal: Total	11,835	1,769	13,604	9,865	3,739	4,607	419,719										3,739	4,607	419,719
	Private	1,350	202	1,552	723	829	1,882	113,810										829	1,882	113,810
	State	-	-	-	-	-	-	-										-	-	-
	Total	13,185	1,971	15,156	10,588	4,568	6,489	533,529										4,568	6,489	533,529
Rogue River National Forest	Federal: National Forest	69,993	17,498	87,491	22,336	65,155	38,574	14,496,200	20,476	5,468	757,818	474	196	9,113				86,105	44,238	15,263,131
	Federal: O & C	13,880	3,470	17,350	11,956	5,394	1,154	196,371	-	-	..	-	-	-				5,394	1,154	196,371
	Federal: Total	83,873	20,968	104,841	34,292	70,549	39,728	14,692,571	20,476	5,468	757,818	474	196	9,113				91,499	45,392	15,459,502
	Private	63,208	15,802	79,010	9,107	69,903	6,902	1,105,988	11,578	1,485	98,465	-	-	-				81,481	8,387	1,204,453
	State	-	-	-	-	-	-	-	-	-	-	-	-	-				-	-	-
	Total	147,081	36,770	183,851	43,399	140,452	46,630	15,798,559	32,054	6,953	856,283	474	196	9,113				172,980	53,779	16,663,955
Siskiyou National Forest	Federal: National Forest	57,436	10,136	67,572	60,239	7,333	2,323	195,637										7,333	2,323	195,637
	Federal: O & C	86,241	15,219	101,460	79,905	21,555	5,119	258,410										21,555	5,119	258,410
	Federal: Total	143,677	25,355	169,032	140,144	28,888	7,442	454,047										28,888	7,442	454,047
	Private	65,745	11,602	77,347	45,791	31,556	4,988	461,868										31,556	4,988	461,868
	State	568	100	668	368	300	43	8,328										300	43	8,328
	Total	209,990	37,057	247,047	186,303	60,744	12,473	924,243										60,744	12,473	924,243
Umpqua National Forest	Federal: National Forest	40,180	10,045	50,225	50,225															
	Federal: O & C	13,029	3,257	16,286	16,286															
	Federal: Total	53,209	13,302	66,511	66,511															
	Private	6,613	1,653	8,266	8,266															
	State	256	64	320	320															
	Total	60,078	15,019	75,097	75,097															
Total All National Forests	Federal: National Forest	175,466	38,853	214,319	138,092	76,227	45,504	15,111,556	20,476	5,468	757,818	474	196	9,113				97,177	51,168	15,878,487
	Federal: O & C	117,128	22,541	139,669	112,720	26,949	6,273	454,781	-	-	-	-	-	-				26,949	6,273	454,781
	Federal: Total	292,594	61,394	353,988	250,812	103,176	51,777	15,566,337	20,476	5,468	757,818	474	196	9,113				124,126	57,441	16,333,268
	Private	136,916	29,259	166,175	63,887	102,288	13,772	1,681,666	11,578	1,485	98,465	-	-	-				113,866	15,257	1,780,131
	State	824	164	988	688	300	43	8,328	-	-	-	-	-	-				300	43	8,328
	Total	430,334	90,817	521,151	315,387	205,764	65,592	17,256,331	32,054	6,953	856,283	474	196	9,113				238,292	72,741	18,121,727
NATIONAL PARKS																				
Crater Lake National Park	Federal	3,374	408	3,782	150	3,632	412	130,162	350	81	13,430							3,982	493	143,592
NURSERY SANITATION																				
McDonald State Forest Clark-McNary Nursery	Private	-	418	418	-	418	178	2,547										418	178	2,547
	State	**18	444	462	50	412	174	2,472										412	174	2,472
	Total	**18	862	880	50	830	352	5,019										830	352	5,019
MT. HEBO WHITE PINE PLANTATION																				
Siuslaw National Forest	Federal	140	540	680	-	680	373	124,744	127	137	19,131	85	91	10,826				892	601	154,701
TOTAL																				
Total All Control Units	Federal	296,108	62,342	358,450	250,962	107,488	52,562	15,821,243	20,953	5,686	790,379	559	287	19,939				129,000	58,535	16,631,561
	Private	136,916	29,677	166,593	63,887	102,706	13,950	1,684,213	11,578	1,485	98,465	-	-	-				114,284	15,435	1,782,678
	State	842	608	1,450	738	712	217	10,800	-	-	-	-	-	-				712	217	10,800
	Total	433,866	92,627	526,493	315,587	210,906	66,729	17,516,256	32,531	7,171	888,844	559	287	19,939				243,996	74,187	18,425,039

* Land ownership as of February 15, 1939.
** Sixteen acres of Nursery and two acres planted pine in Arboretum.

PART C - Total For The Region

Control Unit	Class of Owner-ship*	White and Sugar Pine Type	Non-White and -Sugar Pine Type	Total Acreage	Acreage Unworked	First: Acres Worked	Man Days	Ribes	Second: Acres Worked	Man Days	Ribes	Third: Acres Worked	Man Days	Ribes	Fourth: Acres Worked	Man Days	Ribes	Total: Acres Worked	Man Days	Ribes
California and Oregon	Federal	1,103,081	476,659	1,579,740	1,158,170	421,570	326,971	69,724,747	157,593	87,765	15,499,082	10,193	5,190	480,930	4,716	2,320	141,175	594,072	422,246	85,845,934
	Private	931,843	199,259	1,131,102	730,083	401,019	196,966	48,209,238	120,095	66,168	6,815,311	3,076	1,315	148,401	347	47	1,998	524,537	264,496	55,174,948
	State	11,813	7,042	18,855	13,346	5,509	3,319	528,080	215	26	4,792	-	-	-	-	-	-	5,724	3,345	532,872
	Total	2,046,737	682,960	2,729,697	1,901,599	828,098	527,256	118,462,065	277,903	153,959	22,319,185	13,269	6,505	629,331	5,063	2,367	143,173	1,124,333	690,087	141,553,754

TABLE 2

SUMMARY OF ALL RIBES ERADICATION IN THE SUGAR PINE REGION - 1940

Type of Fund	Class of Work	Acres Worked	Number of 8-Hour Man Days	Total Ribes Eradicated
Bureau of Entomology and Plant Quarantine				
E R A	First Working	8,679	9,330	912,997
	Second Working	46,693	27,701	3,283,752
	Third Working	1,848	827	80,137
	Total - - - -	57,220	37,858	4,276,886
Forest Service				
E R A	First Working	5,331	7,848	829,230
	Second Working	14,226	9,769	767,610
	Third Working	1,511	844	34,144
	Total - - - -	21,118	18,461	1,630,984
C C C	First Working	9,103	15,791	2,599,587
	Second Working	8,532	12,072	1,237,116
	Third Working	85	91	10,826
	Total - - - -	17,720	27,954	3,847,529
Regular	First Working	5,176	2,586	1,224,219
	Second Working	30,924	15,275	2,393,932
	Third Working	420	237	123,007
	Total - - - -	36,520	18,098	3,741,158
Total Forest Service	First Working	19,660	26,225	4,653,036
	Second Working	53,682	37,116	4,398,658
	Third Working	2,016	1,172	167,977
	Total - - - -	75,358	64,513	9,219,671
National Park Service				
C C C	First Working	18,164	30,973	3,727,985
	Second Working	1,993	6,632	1,286,906
	Total - - - -	20,157	37,605	5,014,891
Oregon-California Revested Land Administration				
C C C	First Working	3,163	1,951	186,244
McDonald State Forest - Nursery Sanitation				
N Y A	First Working	830	352	5,019
All Agencies				
Sugar Pine Region	First Working	50,496	68,831	9,485,281
	Second Working	102,368	71,449	8,969,316
	Third Working	3,864	1,999	248,114
	Total - - - -	156,728	142,279	18,702,711

TABLE 3

SUMMARY OF RIBES ERADICATION BY OPERATIONS FOR CALIFORNIA - 1940

PART A - Initial Work

Agency	Type of Funds	Acres Worked	Acres Blocked Out	Acres Total	Man Hours	Total Ribes Eradicated	Per Acre Worked 8-Hour Man Days	Per Acre Worked Ribes	Acres Covered Federal	Acres Covered Private	Acres Covered Total	Number 8-Hour Man Days Federal	Number 8-Hour Man Days Private	Number 8-Hour Man Days Total	Ribes Eradicated Federal	Ribes Eradicated Private	Ribes Eradicated Total
LASSEN NATIONAL FOREST																	
Forest Service	C C C	4,855	-	4,855	36,120	755,570	0.93	156	135	4,720	4,855	135	4,380	4,515	22,667	732,903	755,570
PLUMAS NATIONAL FOREST																	
Forest Service	E R A	4,869	512	5,381	62,784	829,230	1.61	170	5,381	-	5,381	7,848	-	7,848	829,230	-	829,230
	C C C	320	-	320	5,168	47,829	2.02	149	320	-	320	646	-	646	47,829	-	47,829
	Regular	288	488	776	1,064	14,310	0.46	50	640	136	776	109	24	133	11,734	2,576	14,310
Total - - - - - - - -		5,477	1,000	6,477	69,016	891,369	1.57	163	6,341	136	6,477	8,603	24	8,627	888,793	2,576	891,369
ELDORADO NATIONAL FOREST																	
Forest Service	C C C	640	-	640	6,456	81,720	1.26	128	360	280	640	463	344	807	48,246	33,474	81,720
	Regular	3,585	65	3,650	15,072	935,705	0.53	261	3,650	-	3,650	1,884	-	1,884	935,705	-	935,705
	Total	4,225	65	4,290	21,528	1,017,425	0.64	240	4,010	280	4,290	2,347	344	2,691	983,951	33,474	1,017,425
Bureau	E R A	1,395	-	1,395	11,912	290,239	1.07	208	440	955	1,395	378	1,111	1,489	63,905	226,334	290,239
Total - - - - - - - -		5,620	65	5,685	33,440	1,307,664	0.74	232	4,450	1,235	5,685	2,725	1,455	4,180	1,047,856	259,808	1,307,664
STANISLAUS NATIONAL FOREST																	
Forest Service	C C C	1,161	515	1,676	8,056	72,720	0.87	63	320	1,356	1,676	192	815	1,007	13,885	58,835	72,720
	Regular	750	-	750	4,552	274,204	0.76	366	*750	-	750	569	-	569	274,204	-	274,204
Total - - - - - - - -		1,911	515	2,426	12,608	346,924	0.82	181	1,070	1,356	2,426	761	815	1,576	288,089	58,835	346,924
SIERRA NATIONAL FOREST																	
Forest Service	C C C	1,454	-	1,454	70,240	1,636,781	6.04	1,126	1,254	200	1,454	7,668	1,112	8,780	1,436,000	200,781	1,636,781
NATIONAL FOREST TOTALS																	
Forest Service	E R A	4,869	512	5,381	62,784	829,230	1.61	170	5,381	-	5,381	7,848	-	7,848	829,230	-	829,230
	C C C	8,430	515	8,945	126,040	2,594,620	1.87	308	2,389	6,556	8,945	9,104	6,651	15,755	1,568,627	1,025,993	2,594,620
	Regular	4,623	553	5,176	20,688	1,224,219	0.56	265	5,040	136	5,176	2,562	24	2,586	1,221,643	2,576	1,224,219
	Total	17,922	1,580	19,502	209,512	4,648,069	1.46	259	12,810	6,692	19,502	19,514	6,675	26,189	3,619,500	1,028,569	4,648,069
Bureau	E R A	1,395	-	1,395	11,912	290,239	1.07	208	440	955	1,395	378	1,111	1,489	63,905	226,334	290,239
Total - - - - - - - -		19,317	1,580	20,897	221,424	4,938,308	1.43	256	13,250	7,647	20,897	19,892	7,786	27,678	3,683,405	1,254,903	4,938,308
NATIONAL PARKS																	
Lassen Volcanic	C C C	1,901	1,494	3,395	16,104	379,739	1.06	200	3,395	-	3,395	2,013	-	2,013	379,739	-	379,739
Yosemite	C C C	10,991	510	11,501	215,848	3,058,397	2.45	278	11,501	-	11,501	26,981	-	26,981	3,058,397	-	3,058,397
Kings Canyon	C C C	781	-	781	15,544	279,600	2.49	358	781	-	781	1,943	-	1,943	279,600	-	279,600
Total - - - - - - - -		13,673	2,004	15,677	247,496	3,717,736	2.26	272	15,677	-	15,677	30,937	-	30,937	3,717,736	-	3,717,736
CALIFORNIA TOTALS																	
All Agencies	E R A	6,264	512	6,776	74,696	1,119,469	1.49	179	5,821	955	6,776	8,226	1,111	9,337	893,135	226,334	1,119,469
	C C C	22,103	2,519	24,622	373,536	6,312,356	2.11	285	18,066	6,556	24,622	40,041	6,651	46,692	5,286,363	1,025,993	6,312,356
	Regular	4,623	553	5,176	20,688	1,224,219	0.56	264	5,040	136	5,176	2,562	24	2,586	1,221,643	2,576	1,224,219
Total - - - - - - - -		32,990	3,584	36,574	468,920	8,656,044	1.78	262	28,927	7,647	36,574	50,829	7,786	58,615	7,401,141	1,254,903	8,656,044

*These lands in process of acquisition by the U. S. Forest Service.

TABLE 3 (CONTINUED)

SUMMARY OF RIBES ERADICATION BY OPERATIONS FOR CALIFORNIA - 1940

PART B - Reeradication

Agency	Type of Fund	Class of Work	Acres Worked	Man Hours	Total Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status: Acres Covered: Federal	Acres Covered: Private	Acres Covered: Total	Number 8-Hour Man Days: Federal	Number 8-Hour Man Days: Private	Number 8-Hour Man Days: Total	Ribes Eradicated: Federal	Ribes Eradicated: Private	Ribes Eradicated: Total	Acreage Ribes-free at time of Re-eradication
PLUMAS NATIONAL FOREST																	
Forest Service	E R A	Second Working	3,107	20,152	209,658	0.81	67	2,933	174	3,107	2,368	151	2,519	197,079	12,579	209,658	498
	C C C	Second Working	4,480	42,288	1,000,171	1.18	223	1,105	3,375	4,480	1,322	3,964	5,286	250,043	750,128	1,000,171	383
	Regular	Second Working	18,079	78,104	728,445	0.54	40	10,133	7,946	18,079	5,467	4,296	9,763	407,929	320,516	728,445	5,822
	Total	- - - - - - - -	25,666	140,544	1,938,274	0.68	76	14,171	11,495	25,666	9,157	8,411	17,568	855,051	1,083,223	1,938,274	6,703
Bureau	E R A	Second Working	15,198	75,152	1,077,494	0.62	71	3,183	12,015	15,198	1,973	7,421	9,394	226,274	851,220	1,077,494	3,627
		Third Working	1,208	4,328	26,363	0.45	22	938	270	1,208	422	119	541	20,563	5,800	26,363	1,064
		Total	16,406	79,480	1,103,857	0.61	67	4,121	12,285	16,406	2,395	7,540	9,935	246,837	857,020	1,103,857	4,691
Forest Summary	Second Working		40,864	215,696	3,015,768	0.66	74	17,354	23,510	40,864	11,130	15,832	26,962	1,081,325	1,934,443	3,015,768	10,330
	Third Working		1,208	4,328	26,363	0.45	22	938	270	1,208	422	119	541	20,563	5,800	26,363	1,064
	Total	- - - - - - - -	42,072	220,024	3,042,131	0.65	72	18,292	23,780	42,072	11,552	15,951	27,503	1,101,888	1,940,243	3,042,131	11,394
ELDORADO NATIONAL FOREST																	
Forest Service	E R A	Second Working	11,119	58,000	557,952	0.65	50	3,245	7,874	11,119	1,775	5,475	7,250	88,386	469,566	557,952	635
		Third Working	1,511	6,752	34,144	0.56	23	1,121	390	1,511	597	247	844	26,738	7,406	34,144	-
		Total	12,630	64,752	592,096	0.64	47	4,366	8,264	12,630	2,372	5,722	8,094	115,124	476,972	592,096	635
	C C C	Second Working	1,920	25,440	156,952	1.66	82	1,840	80	1,920	3,014	166	3,180	148,791	8,161	156,952	-
	Regular	Second Working	2,020	3,744	31,355	0.23	155	1,860	160	2,020	442	26	468	29,396	1,959	31,355	65
	Second Working		15,059	87,184	746,259	0.72	50	6,945	8,114	15,059	5,231	5,667	10,898	266,573	479,686	746,259	700
	Third Working		1,511	6,752	34,144	0.56	23	1,121	390	1,511	597	247	844	26,738	7,406	34,144	-
	Total	- - - - - - - -	16,570	93,936	780,403	0.71	47	8,066	8,504	16,570	5,828	5,914	11,742	293,311	487,092	780,403	700
Bureau	E R A	Second Working	16,450	76,688	771,945	0.58	47	4,925	11,525	16,450	2,440	7,146	9,586	211,613	560,332	771,945	590
Forest Summary	Second Working		31,509	163,872	1,518,204	0.65	48	11,870	19,639	31,509	7,671	12,813	20,484	478,186	1,040,018	1,518,204	1,290
	Third Working		1,511	6,752	34,144	0.56	23	1,121	390	1,511	597	247	844	26,738	7,406	34,144	-
	Total	- - - - - - - -	33,020	170,624	1,552,348	0.65	47	12,991	20,029	33,020	8,268	13,060	21,328	504,924	1,047,424	1,552,348	1,290
STANISLAUS NATIONAL FOREST																	
Forest Service	C C C	Second Working	2,090	28,280	71,344	1.69	34	120	1,970	2,090	203	3,332	3,535	4,096	67,248	71,344	400
	Regular	Second Working	3,730	14,832	906,078	0.50	243	•3,730	-	3,730	1,854	-	1,854	906,078	-	906,078	50
		Third Working	420	1,896	123,007	0.56	293	• 340	80	420	192	45	237	99,577	23,430	123,007	-
		Total	4,150	16,728	1,029,085	0.50	248	4,070	80	4,150	2,046	45	2,091	1,005,655	23,430	1,029,085	50
	Second Working		5,820	43,112	977,422	0.93	168	3,850	1,970	5,820	2,057	3,332	5,389	910,174	67,248	977,422	450
	Third Working		420	1,896	123,007	0.56	293	340	80	420	192	45	237	99,577	23,430	123,007	-
	Total	- - - - - - - -	6,240	45,008	1,100,429	0.90	176	4,190	2,050	6,240	2,249	3,377	5,626	1,009,751	90,678	1,100,429	450
Bureau	E R A	Second Working	15,045	69,768	1,434,313	0.58	95	1,440	13,605	15,045	835	7,886	8,721	137,282	1,297,031	1,434,313	825
		Third Working	640	2,288	53,774	0.45	84	-	640	640	-	286	286	-	53,774	53,774	-
		Total	15,685	72,056	1,488,087	0.57	95	1,440	14,245	15,685	835	8,172	9,007	137,282	1,350,805	1,488,087	825
Forest Summary	Second Working		20,865	112,880	2,411,735	0.68	116	5,290	15,575	20,865	2,892	11,218	14,110	1,047,456	1,364,279	2,411,735	1,275
	Third Working		1,060	4,184	176,781	0.49	167	340	720	1,060	192	331	523	99,577	77,204	176,781	-
	Total	- - - - - - - -	21,925	117,064	2,588,516	0.67	118	5,630	16,295	21,925	3,084	11,549	14,633	1,147,033	1,441,483	2,588,516	1,275
SIERRA NATIONAL FOREST																	
Forest Service	Regular	Second Working	7,095	25,520	728,054	0.45	103	4,010	3,085	7,095	2,046	1,144	3,190	495,184	232,870	728,054	250
NATIONAL FOREST TOTALS																	
Forest Service	E R A	Second Working	14,226	78,152	767,610	0.69	54	6,178	8,048	14,226	4,143	5,626	9,769	285,465	482,145	767,610	1,133
		Third Working	1,511	6,752	34,144	0.56	23	1,121	390	1,511	597	247	844	26,738	7,406	34,144	-
		Total	15,771	84,904	801,754	0.67	51	7,299	8,438	15,737	4,740	5,873	10,613	312,203	489,551	801,754	1,133
	C C C	Second Working	8,490	96,008	1,228,467	1.41	145	3,065	5,425	8,490	4,539	7,462	12,001	402,930	825,537	1,228,467	783
	Regular	Second Working	30,924	122,200	2,393,932	0.49	77	19,733	11,191	30,924	9,809	5,466	15,275	1,838,587	555,345	2,393,932	6,187
		Third Working	420	1,896	123,007	0.56	293	340	80	420	192	45	237	99,577	23,430	123,007	-
		Total	31,344	124,096	2,516,939	0.49	80	20,073	11,271	31,344	10,001	5,511	15,512	1,938,164	578,775	2,516,939	6,187
	Second Working		53,640	296,360	4,390,009	0.69	82	28,976	24,664	53,640	18,491	18,554	37,045	2,526,982	1,863,027	4,390,009	8,103
	Third Working		1,931	8,648	157,151	0.56	81	1,461	470	1,931	789	292	1,081	126,315	30,836	157,151	-
	Total	- - - - - - - -	55,571	305,008	4,547,160	0.69	82	30,437	25,134	55,571	19,280	18,846	38,126	2,653,297	1,893,863	4,547,160	8,103
Bureau	E R A	Second Working	46,693	221,608	3,283,752	0.59	70	9,548	37,145	46,693	5,248	22,453	27,701	575,169	2,708,583	3,283,752	5,042
		Third Working	1,848	6,616	80,137	0.45	43	938	910	1,848	422	405	827	20,563	59,574	80,137	1,064
		Total	48,541	228,224	3,363,889	0.59	69	10,486	38,055	48,541	5,670	22,858	28,528	595,732	2,768,157	3,363,889	6,106
Summary All National Forests	Second Working		100,333	517,968	7,673,761	0.65	76	38,524	61,809	100,333	23,739	41,007	64,746	3,102,151	4,571,610	7,673,761	13,145
	Third Working		3,779	15,264	237,288	0.50	63	2,399	1,380	3,779	1,211	697	1,908	146,878	90,410	237,288	1,064
	Total	- - - - - - - -	104,112	533,232	7,911,049	0.64	76	40,923	63,189	104,112	24,950	41,704	66,654	3,249,029	4,662,020	7,911,049	14,209
YOSEMITE NATIONAL PARK																	
National Park Service	C C C	Second Working	1,643	52,408	1,273,476	3.99	775	1,643	-	1,643	6,551	-	6,551	1,273,476	-	1,273,476	-
CALIFORNIA TOTALS																	
Total All Agencies	E R A	Second Working	60,919	299,760	4,051,362	0.62	67	15,726	45,193	60,919	9,391	28,079	37,470	860,634	3,190,728	4,051,362	6,175
		Third Working	3,359	13,368	114,281	0.50	34	2,059	1,300	3,359	1,019	652	1,671	47,301	66,980	114,281	1,064
		Total	64,278	313,128	4,165,643	0.61	65	17,785	46,493	64,278	10,410	28,731	39,141	907,935	3,257,708	4,165,643	7,239
	C C C	Second Working	10,133	148,416	2,501,943	1.83	247	4,708	5,425	10,133	11,090	7,462	18,552	1,676,406	825,537	2,501,943	783
	Regular	Second Working	30,924	122,200	2,393,932	0.49	77	19,733	11,191	30,924	9,809	5,466	15,275	1,838,587	555,345	2,393,932	6,187
		Third Working	420	1,896	123,007	0.56	293	340	80	420	192	45	237	99,577	23,430	123,007	-
		Total	31,344	124,096	2,516,939	0.49	80	20,073	11,271	31,344	10,001	5,511	15,512	1,938,164	578,775	2,516,939	6,187
	Second Working		101,976	570,376	8,947,237	0.70	88	40,167	61,809	101,976	30,290	41,007	71,297	4,375,627	4,571,610	8,947,237	13,145
	Third Working		3,779	15,264	237,288	0.50	63	2,399	1,380	3,779	1,211	697	1,908	146,878	90,410	237,288	1,064
	Total	- - - - - - - -	105,755	585,640	9,184,525	0.69	87	42,566	63,189	105,755	31,501	41,704	73,205	4,522,505	4,662,020	9,184,525	14,209

• These lands in process of acquisition by the U. S. Forest Service.

TABLE 3 (CONTINUED)

SUMMARY OF RIBES ERADICATION BY OPERATIONS FOR CALIFORNIA - 1940

PART C - All Workings

Agency	Type of Funds	Acres Worked*	Man Hours	Total Ribes Eradicated	Ownership Status: Acres Covered: Federal	Acres Covered: Private	Acres Covered: Total	Number 8-Hour Man Days: Federal	Man Days: Private	Man Days: Total	Ribes Eradicated: Federal	Ribes Eradicated: Private	Ribes Eradicated: Total
LASSEN NATIONAL FOREST													
Forest Service	C C C	4,855	36,120	755,570	135	4,720	4,855	135	4,380	4,515	22,667	732,903	755,570
PLUMAS NATIONAL FOREST													
Forest Service	E R A	8,488	82,936	1,038,888	8,314	174	8,488	10,216	151	10,367	1,026,309	12,579	1,038,888
	C C C	4,800	47,456	1,048,000	1,425	3,375	4,800	1,968	3,964	5,932	297,872	750,128	1,048,000
	Regular	18,855	79,168	742,755	10,773	8,082	18,855	5,576	4,320	9,896	419,663	323,092	742,755
	Total	32,143	209,560	2,829,643	20,512	11,631	32,143	17,760	8,435	26,195	1,743,844	1,085,799	2,829,643
Bureau	E R A	16,406	79,480	1,103,857	4,121	12,285	16,406	2,395	7,540	9,935	246,837	857,020	1,103,857
Total - - - - - - -		48,549	289,040	3,933,500	24,633	23,916	48,549	20,155	15,975	36,130	1,990,681	1,942,819	3,933,500
ELDORADO NATIONAL FOREST													
Forest Service	E R A	12,630	64,752	592,096	4,366	8,264	12,630	2,372	5,722	8,094	115,124	476,972	592,096
	C C C	2,560	31,896	238,672	2,200	360	2,560	3,477	510	3,987	197,037	41,635	238,672
	Regular	5,670	18,816	967,060	5,510	160	5,670	2,326	26	2,352	965,101	1,959	967,060
	Total	20,860	115,464	1,797,828	12,076	8,784	20,860	8,175	6,258	14,433	1,277,262	520,566	1,797,828
Bureau	E R A	17,845	88,600	1,062,184	5,365	12,480	17,845	2,818	8,257	11,075	275,518	786,666	1,062,184
Total - - - - - - -		38,705	204,064	2,860,012	17,441	21,264	38,705	10,993	14,515	25,508	1,552,780	1,307,232	2,860,012
STANISLAUS NATIONAL FOREST													
Forest Service	C C C	3,766	36,336	144,064	440	3,326	3,766	395	4,147	4,542	17,981	126,083	144,064
	Regular	4,900	21,280	1,303,289	4,820	80	4,900	2,615	45	2,660	1,279,859	23,430	1,303,289
	Total	8,666	57,616	1,447,353	5,260	3,406	8,666	3,010	4,192	7,202	1,297,840	149,513	1,447,353
Bureau	E R A	15,685	72,056	1,488,087	1,440	14,245	15,685	835	8,172	9,007	137,282	1,350,805	1,488,087
Total - - - - - - -		24,351	129,672	2,935,440	6,700	17,651	24,351	3,845	12,364	16,209	1,435,122	1,500,318	2,935,440
SIERRA NATIONAL FOREST													
Forest Service	C C C	1,454	70,240	1,636,781	1,254	200	1,454	7,668	1,112	8,780	1,436,000	200,781	1,636,781
	Regular	7,095	25,520	728,054	4,010	3,085	7,095	2,046	1,144	3,190	495,184	232,870	728,054
Total - - - - - - -		8,549	95,760	2,364,835	5,264	3,285	8,549	9,714	2,256	11,970	1,931,184	433,651	2,364,835
NATIONAL FOREST TOTALS													
Forest Service	E R A	21,118	147,688	1,630,984	12,680	8,438	21,118	12,588	5,873	18,461	1,141,433	489,551	1,630,984
	C C C	17,435	222,048	3,823,087	5,454	11,981	17,435	13,643	14,113	27,756	1,971,557	1,851,530	3,823,087
	Regular	36,520	144,784	3,741,158	25,113	11,407	36,520	12,563	5,535	18,098	3,159,807	581,351	3,741,158
	Total	75,073	514,520	9,195,229	43,247	31,826	75,073	38,794	25,521	64,315	6,272,797	2,922,432	9,195,229
Bureau	E R A	49,936	240,136	3,654,128	10,926	39,010	49,936	6,048	23,969	30,017	659,637	2,994,491	3,654,128
Total - - - - - - -		125,009	754,656	12,849,357	54,173	70,836	125,009	44,842	49,490	94,332	6,932,434	5,916,923	12,849,357
NATIONAL PARKS													
Lassen Volcanic	C C C	3,395	16,104	379,739	3,395	-	3,395	2,013	-	2,013	379,739	-	379,739
Yosemite	C C C	13,144	268,256	4,331,873	13,144	-	13,144	33,532	-	33,532	4,331,873	-	4,331,873
Kings Canyon	C C C	781	15,544	279,600	781	-	781	1,943	-	1,943	279,600	-	279,600
Total - - - - - - -		17,320	299,904	4,991,212	17,320	-	17,320	37,488	-	37,488	4,991,212	-	4,991,212
CALIFORNIA TOTALS													
All Agencies	E R A	71,054	387,824	5,285,112	23,606	47,448	71,054	18,636	29,842	48,478	1,801,070	3,484,042	5,285,112
	C C C	34,755	521,952	8,814,299	22,774	11,981	34,755	51,131	14,113	65,244	6,962,769	1,851,530	8,814,299
	Regular	36,520	144,784	3,741,158	25,113	11,407	36,520	12,563	5,535	18,098	3,159,807	581,351	3,741,158
Total - - - - - - -		142,329	1,054,560	17,840,569	71,493	70,836	142,329	82,330	49,490	131,820	11,923,646	5,916,923	17,840,569

TABLE 4

SUMMARY OF RIBES ERADICATION FOR OREGON - 1940

Agency and Type of Funds	Class of Work	Acres: Worked	Acres: Blocked Out	Acres: Total	Man Hours	Total Ribes Eradicated	Per Acre Worked: 8-Hour Man Days	Per Acre Worked: Ribes	Ownership Status — Acres Covered: Federal: National Forest	Acres Covered: Federal: O & C	Acres Covered: Federal: National Park	Acres Covered: Federal: Total	Acres Covered: State	Acres Covered: Private	Acres Covered: Total	Number 8-Hour Man Days: Federal: National Forest	Man Days: Federal: O & C	Man Days: Federal: National Park	Man Days: Federal: Total	Man Days: State	Man Days: Private	Man Days: Total	Ribes Eradicated: Federal: National Forest	Ribes Eradicated: Federal: O & C	Ribes Eradicated: Federal: National Park	Ribes Eradicated: Federal: Total	Ribes Eradicated: State	Ribes Eradicated: Private	Ribes Eradicated: Total	Acreage Ribes-free at time of Re-eradication
SISKIYOU NATIONAL FOREST																														
Bureau - ERA	First Working	2,097	619	2,716	10,816	89,229	0.64	43	137	1,299	-	1,436	-	1,280	2,716	75	990	-	1,065	-	287	1,352	3,563	72,161	-	75,724	-	13,505	89,229	-
O & C - CCC	First Working	1,856	1,307	3,163	15,608	186,244	1.05	100	671	2,016	-	2,687	-	476	3,163	677	1,199	-	1,876	-	75	1,951	100,772	83,993	-	184,765	-	1,479	186,244	-
Total - - - - - - - -		3,953	1,926	5,879	26,424	275,473	0.84	70	808	3,315	-	4,123	-	1,756	5,879	752	2,189	-	2,941	-	362	3,303	104,335	156,154	-	260,489	-	14,984	275,473	-
KLAMATH NATIONAL FOREST																														
Bureau - ERA	First Working	4,275	293	4,568	51,912	533,529	1.52	125	3,739	-	-	3,739	-	829	4,568	4,607	-	-	4,607	-	1,882	6,489	419,719	-	-	419,719	-	113,810	533,529	-
MT. HEBO WHITE PINE PLANTATION - (Siuslaw National Forest)																														
Forest Service-CCC	First Working	18	140	158	288	4,967	2.00	276	158	-	-	158	-	-	158	36	-	-	36	-	-	36	4,967	-	-	4,967	-	-	4,967	-
	Second Working	42	-	42	568	8,649	1.69	206	42	-	-	42	-	-	42	71	-	-	71	-	-	71	8,649	-	-	8,649	-	-	8,649	-
	Third Working	85	-	85	728	10,826	1.07	127	85	-	-	85	-	-	85	91	-	-	91	-	-	91	10,826	-	-	10,826	-	-	10,826	395
Total - - - - - - - -		145	140	285	1,584	24,442	1.36	169	285	-	-	285	-	-	285	198	-	-	198	-	-	198	24,442	-	-	24,442	-	-	24,442	395
NURSERY SANITATION - (McDonald State Forest)																														
State - NYA	First Working	486	344	830	2,816	5,019	0.72	10	-	-	-	-	412	418	830	-	-	-	-	174	178	352	-	-	-	-	2,472	2,547	5,019	-
CRATER LAKE NATIONAL PARK																														
National Park - CCC	First Working	70	2,417	2,487	288	10,249	0.51	146	-	-	2,487	2,487	-	-	2,487	-	-	36	36	-	-	36	-	-	10,249	10,249	-	-	10,249	-
	Second Working	350	-	350	648	13,430	0.23	38	-	-	350	350	-	-	350	-	-	81	81	-	-	81	-	-	13,430	13,430	-	-	13,430	795
Total - - - - - - - -		420	2,417	2,837	936	23,679	0.28	56	-	-	2,837	2,837	-	-	2,837	-	-	117	117	-	-	117	-	-	23,679	23,679	-	-	23,679	795
TOTALS																														
All Agencies	First Working	8,802	5,120	13,922	81,728	829,237	1.16	94	4,705	3,315	2,487	10,507	412	3,003	13,922	5,395	2,189	36	7,620	174	2,422	10,216	529,021	156,154	10,249	695,424	2,472	131,341	829,237	-
	Second Working	392	-	392	1,216	22,079	0.39	56	42	-	350	392	-	-	392	71	-	81	152	-	-	152	8,649	-	13,430	22,079	-	-	22,079	795
	Third Working	85	-	85	728	10,826	1.07	127	85	-	-	85	-	-	85	91	-	-	91	-	-	91	10,826	-	-	10,826	-	-	10,826	395
Total - - - - - - - -		9,279	5,120	14,399	83,672	862,142	1.13	93	4,832	3,315	2,837	10,984	412	3,003	14,399	5,557	2,189	117	7,863	174	2,422	10,459	548,496	156,154	23,679	728,329	2,472	131,341	862,142	1,190

TABLE 5

RIBES ERADICATED BY SPECIES - CALIFORNIA, 1940

Agency	Class of Work	Ribes roezli	Ribes nevadense	Ribes viscosissimum	Ribes cereum	Ribes inerme	Ribes montigenum	Total Ribes Eradicated
Lassen National Forest	First Working	561,190	144,029	-	-	50,351	-	755,570
Plumas National Forest	First Working	579,411	294,629	17,060	-	269	-	891,369
	Second Working	2,672,940	277,231	21,558	1,026	43,013	-	3,015,768
	Third Working	24,151	1,933	279	-	-	-	26,363
	Total - - - -	3,276,502	573,793	38,897	1,026	43,282	-	3,933,500
Eldorado National Forest	First Working	872,175	374,383	54,809	6,297	-	-	1,307,664
	Second Working	1,431,372	83,099	91	3,642	-	-	1,518,204
	Third Working	33,292	852	-	-	-	-	34,144
	Total - - - -	2,336,839	458,334	54,900	9,939	-	-	2,860,012
Stanislaus National Forest	First Working	317,289	29,635	-	-	-	-	346,924
	Second Working	2,237,355	174,380	-	-	-	-	2,411,735
	Third Working	174,357	2,424	-	-	-	-	176,781
	Total - - - -	2,729,001	206,439	-	-	-	-	2,935,440
Sierra National Forest	First Working	1,623,348	13,433	-	-	-	-	1,636,781
	Second Working	591,109	136,945	-	-	-	-	728,054
	Total - - - -	2,214,457	150,378	-	-	-	-	2,364,835
Lassen Volcanic National Park	First Working	13,844	86,395	34,998	33,967	-	210,535	379,739
Yosemite National Park	First Working	2,420,714	484,401	540	152,742	-	-	3,058,397
	Second Working	1,203,817	69,659	-	-	-	-	1,273,476
	Total - - - -	3,624,531	554,060	540	152,742	-	-	4,331,873
Kings Canyon National Park	First Working	222,017	16,047	39,564	1,972	-	-	279,600
Total All Agencies	First Working	6,609,988	1,442,952	146,971	194,978	50,620	210,535	8,656,044
	Second Working	8,136,593	741,314	21,649	4,668	43,013	-	8,947,237
	Third Working	231,800	5,209	279	-	-	-	237,288
	Total - - - -	14,978,381	2,189,475	168,899	199,646	93,633	210,535	17,840,569

TABLE 6

RIBES ERADICATED BY SPECIES - OREGON, 1940

Agency	Class of Work	Ribes binominatum	Ribes bracteosum	Ribes cereum	Ribes cruentum	Ribes erythrocarpum	Ribes klamathense	Ribes inerme	Ribes lacustre	Ribes lobbii	Ribes sanguineum	Ribes viscosissimum	Total Ribes Eradicated
Siskiyou National Forest	First Working	-	-	-	220,419	-	375	-	-	20,985	33,694	-	275,473
Klamath National Forest	First Working	3,074	-	505	8,631	-	-	-	232,085	101,663	184,052	3,519	533,529
Siuslaw National Forest-Mt. Rebo White Pine Plantation	First Working	-	4,967	-	-	-	-	-	-	-	-	-	4,967
	Second Working	-	8,649	-	-	-	-	-	-	-	-	-	8,649
	Third Working	-	10,826	-	-	-	-	-	-	-	-	-	10,826
	Total - - -	-	24,442	-	-	-	-	-	-	-	-	-	24,442
McDonald State Forest-Nursery Sanitation	First Working	-	-	-	-	-	-	1,229	-	-	3,790	-	5,019
Crater Lake National Park	First Working	-	-	518	-	9,731	-	-	-	-	-	-	10,249
	Second Working	-	-	1,225	-	11,783	-	-	422	-	-	-	13,430
	Total - - -	-	-	1,743	-	21,514	-	-	422	-	-	-	23,679
Total All Agencies	First Working	3,074	4,967	1,023	229,050	9,731	375	1,229	232,085	122,648	221,536	3,519	829,237
	Second Working	-	8,649	1,225	-	11,783	-	-	422	-	-	-	22,079
	Third Working	-	10,826	-	-	-	-	-	-	-	-	-	10,826
	Total - - -	3,074	24,442	2,248	229,050	21,514	375	1,229	232,507	122,648	221,536	3,519	862,142

TABLE 7

THE DISTRIBUTION OF CAMPS BY OPERATION AND COUNTY IN THE SUGAR PINE REGION DURING 1940

Control Unit	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
			OREGON		
Siskiyou National Forest	EQ - ERA	Josephine	1-100 Man	May 15 - June 30	Swede Basin
	O & C - CCC	Josephine	1-50 Man	June 1 - Oct. 1	Spaulding Mill
Klamath National Forest	EQ - ERA	Jackson	1-110 Man	April 10 - Oct. 5	Cottonwood Creek
White Pine Plantation Siuslaw National Forest	FS - CCC	Tillamook	1-25 Man	June 1 - July 20	Mt. Hebo
Nursery Sanitation McDonald State Forest	State - NYA	Benton	1-10 Man	July 1 - Sept. 15	Peavy Arboretum
Crater Lake National Park	NPS - CCC	Klamath	1-20 Man	July 31 - Sept. 15	Cloud Cap
			CALIFORNIA		
Lassen National Forest	FS - CCC	Tehama	1-80 Man	June 10 - Sept. 15	Soda Springs
	FS - CCC	Tehama	1-50 Man	May 20 - June 10 Sept. 1 - Oct. 1	Deer Creek
Plumas National Forest	FS - ERA	Plumas	1-100 Man	May 10 - Sept. 10	Coldwater
	FS - ERA	Plumas	1-100; 1-50 Man	May 10 - July 1	Ohio and Deanes Valleys
	FS - ERA	Butte	1-100 Man	May 15 - Sept. 15	Big Bar
	FS - CCC	Plumas	1-125 Man	June 10 - Sept. 15	Humbug Valley
					Thompson and Estray Creeks
	FS - Reg.	Plumas	4-33 Man	May 15 - Sept. 15	Long and Round Valleys
	EQ - ERA	Plumas	2-100 Man	May 1 - Oct. 1	Prattville and Wolf Creek
Eldorado National Forest	FS - ERA	El Dorado	2-50 Man	May 1 - Sept. 10	Pi Pi and Grelich
	FS - ERA	Amador	2-50 Man	May 1 - Sept. 10	Matson Mill and Mill Creek
	FS - CCC	El Dorado	1-100 Man	May 10 - Oct. 15	Caldor
	FS - Reg.	El Dorado	1-33 Man	May 1 - Oct. 1	Pyramid
	EQ - ERA	El Dorado	2-120 Man	May 1 - Oct. 1	Ice House and Jones

TABLE 7 (CONTINUED)

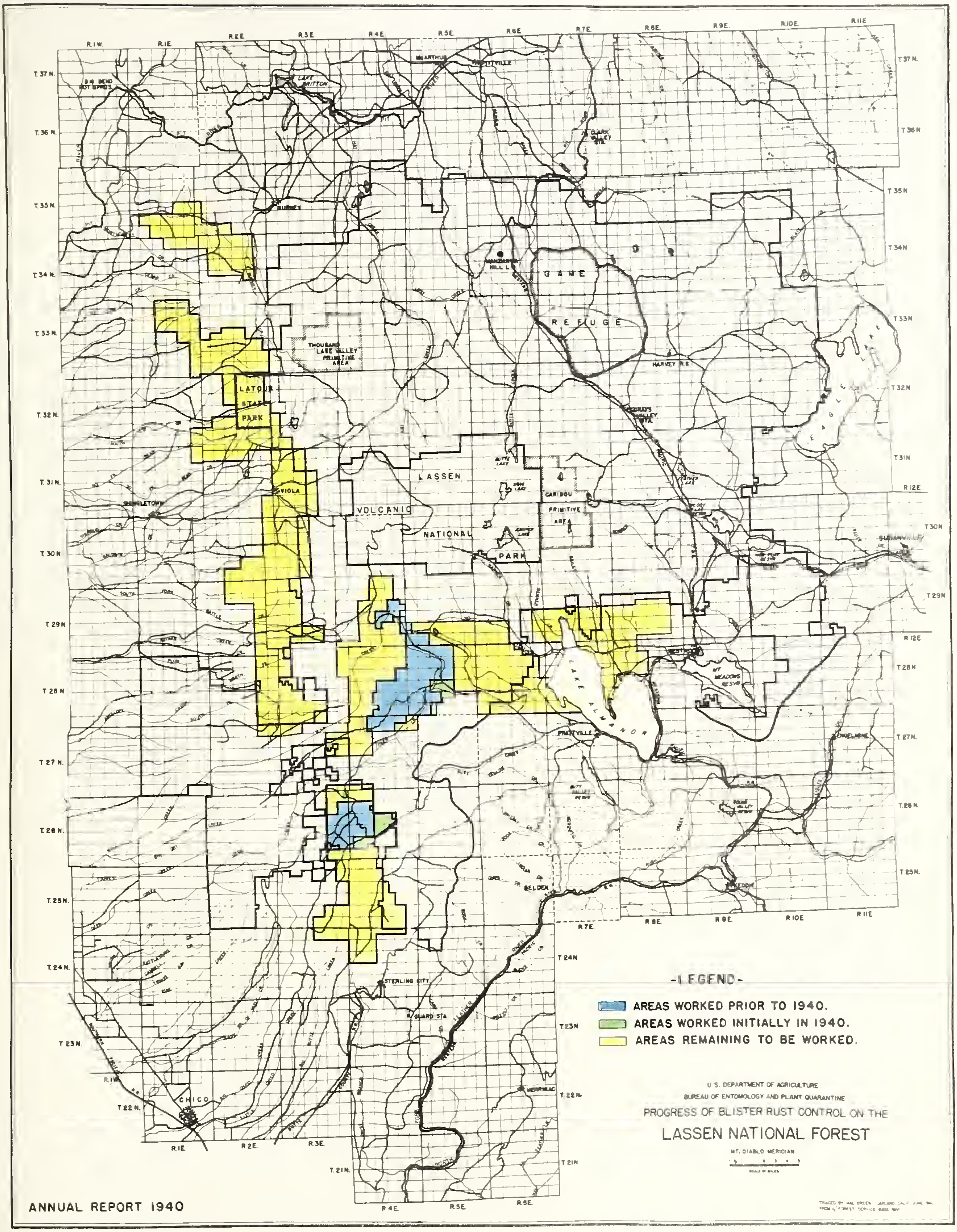
THE DISTRIBUTION OF CAMPS BY OPERATION AND COUNTY IN THE SUGAR PINE REGION DURING 1940

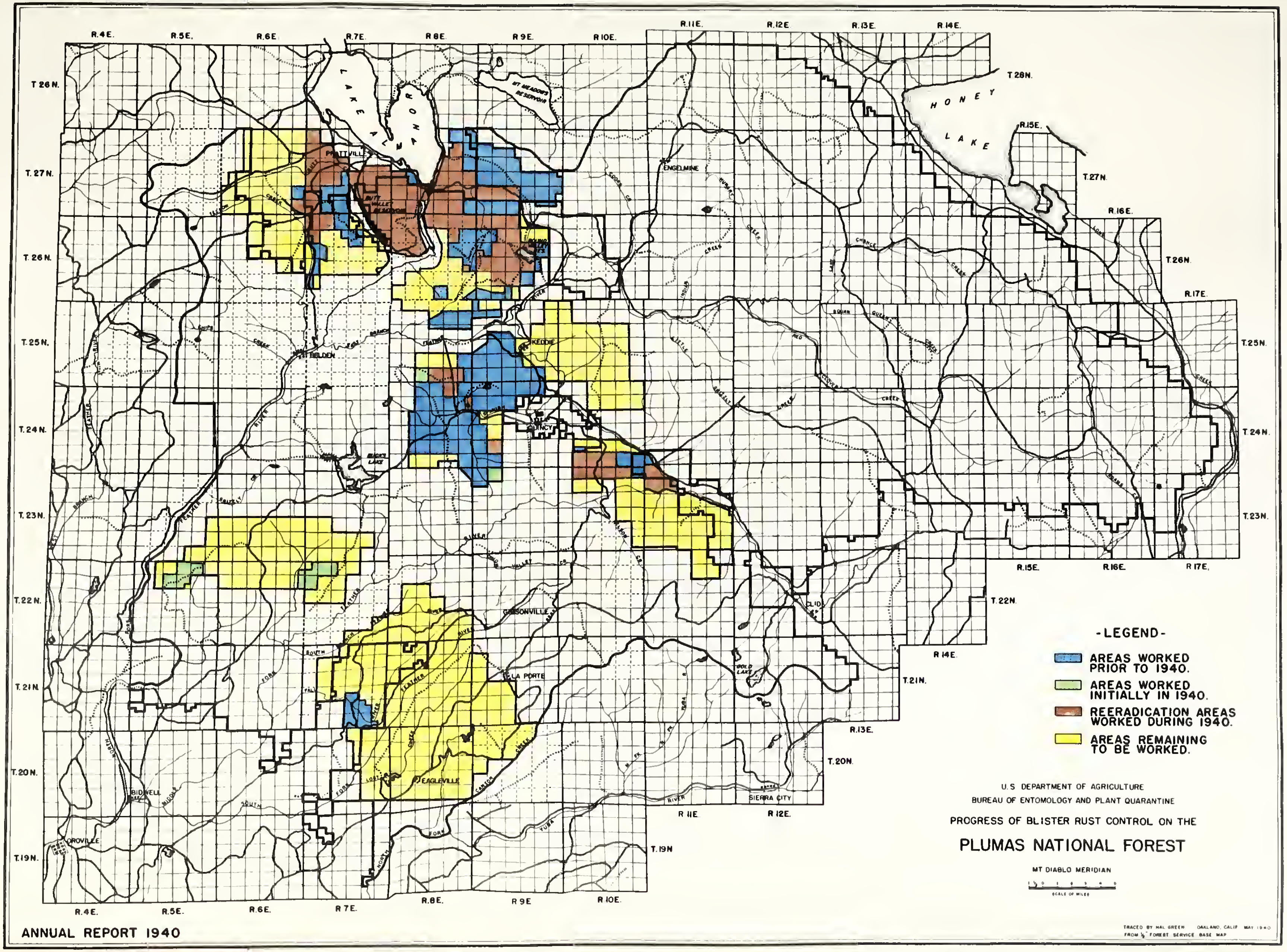
Control Unit	Agency and Fund	County	Number and Average Size of Camps	Approximate Period of Operation	Location
CALIFORNIA					
Stanislaus National Forest	FS - CCC	Tuolumne	1-110 Man	May 10 - Oct. 1	Skull Creek
	FS - Regular	Tuolumne	1-33 Man	May 1 - Oct. 1	Camp 17
	EQ - ERA	Tuolumne	1-130 Man	May 1 - Oct. 15	Thompson Meadows
	EQ - ERA	Tuolumne	1-100 Man	May 6 - Sept. 20	Beaver Creek
Sierra National Forest	FS - CCC	Madera	1-130 Man	May 1 - Oct. 15	Soquel
	FS - Regular	Mariposa	1-33 Man	May 1 - Sept. 30	Miami Creek
Lassen Volcanic National Park	NPS - CCC	Tehama	1-25 Man	July 22 - Sept. 15	White Mountain
	NPS - CCC	Shasta	1-50 Man	July 15 - Sept. 1	Lost Creek
Yosemite National Park	NPS - CCC	Tuolumne	1-135 Man	July 15 - Oct. 10	Middle Fork
	NPS - CCC	Tuolumne	1-75 Man	April 25 - Oct. 20	Crane Flat
	NPS - CCC	Mariposa	1-140 Man	July 15 - Oct. 10	Tamarack
	NPS - CCC	Mariposa	1-135 Man	July 15 - Oct. 10	Empire Meadows
	NPS - CCC	Mariposa	1-50 Man	April 15 - Oct. 20	Wawona
Kings Canyon National Park	NPS - CCC	Fresno	1-40 Man	July 15 - Oct. 15	Cedar Grove

TABLE 8

ADJUSTED STATEMENT OF COST OF RIBES ERADICATION FOR THE SUGAR PINE REGION - 1940
(Bureau Only)

Classification of Expenditures		Plumas Operation	Eldorado Operation	Stanislaus Operation	Oregon Operation
Wages - Temporary employees		$39,296	$43,837	$33,885	$39,979
Subsistence supplies		14,851	17,561	13,909	6,230
Other Supplies and Expenses		2,679	2,571	2,100	437
Transportation and Travel		2,595	2,649	2,467	1,684
Gross Distributed Expenditures		59,421	66,618	52,361	48,330
Plus	Twine furnished from stock	107	148	140	566
	Subsistence supplies from stock	-	-	-	401
	Depreciation on Equipment	1,981	1,982	1,981	1,982
Total Eradication Charges - - - -		$61,509	$68,748	$54,482	$51,279
Number of Effective Man Days		9,935	11,075	9,007	7,841
Cost per Effective Man Day		$6.19	$6.21	$6.05	$6.54


-LEGEND-
AREAS WORKED PRIOR TO 1940.
AREAS WORKED INITIALLY IN 1940.
AREAS REMAINING TO BE WORKED.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
LASSEN NATIONAL FOREST
MT. DIABLO MERIDIAN
ANNUAL REPORT 1940
LASSEN VOLCANIC NATIONAL PARK
GAME REFUGE
LATOUR STATE PARK
THOUSAND LAKE VALLEY PRIMITIVE AREA
CARIBOU PRIMITIVE AREA
LAKE ALMANOR
EAGLE LAKE
LAKE BRITTON
CHICO
VIOLA
SHINGLETOWN
PRATTVILLE
STERLING CITY
BELDEN
SUSANVILLE
HARVEY R.S.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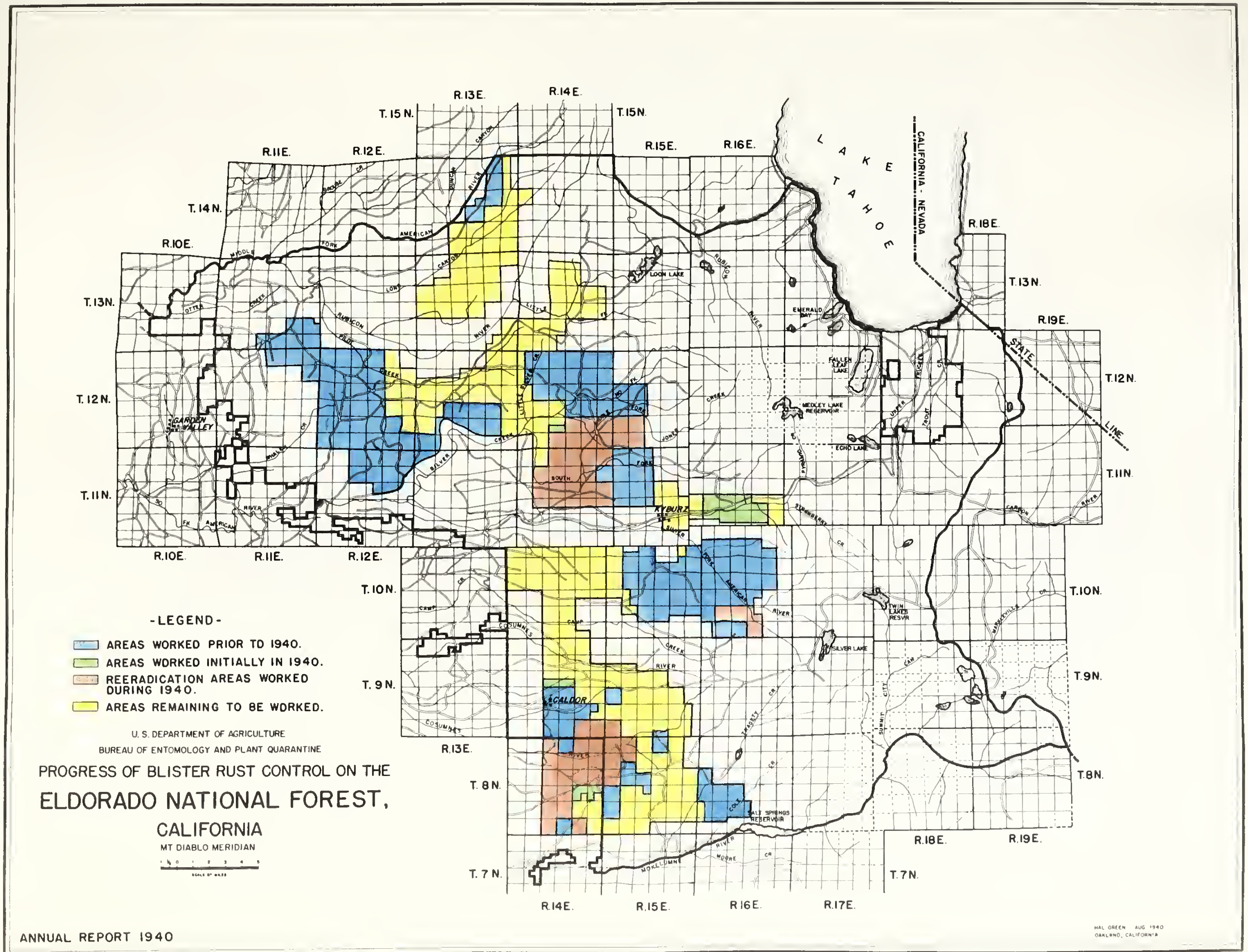
AREAS WORKED INITIALLY IN 1940.
REERADICATION AREAS WORKED DURING 1940.
AREAS REMAINING TO BE WORKED.
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
PLUMAS NATIONAL FOREST
MT DIABLO MERIDIAN
LAKE ALMANOR
HONEY LAKE
ENGELMINE
PRATTVILLE
KEDDIE
QUINCY
BELDEN
GREENVILLE
LA PORTE
EAGLEVILLE
SIERRA CITY
OROVILLE
BIDWELL
ANNUAL REPORT 1940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U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
ELDORADO NATIONAL FOREST,
CALIFORNIA
MT DIABLO MERIDIAN
LAKE TAHOE
CALIFORNIA - NEVADA
STATE LINE
LOON LAKE
EMERALD BAY
FALLEN LEAF LAKE
MEDLEY LAKE RESERVOIR
ECHO LAKE
TWIN LAKES RESVR
SILVER LAKE
SALT SPRINGS RESERVOIR
KYBURZ
CALDOR
GARDEN VALLEY
R.10E.
R.11E.
R.12E.
R.13E.
R.14E.
R.15E.
R.16E.
R.17E.
R.18E.
R.19E.
T.7N.
T.8N.
T.9N.
T.10N.
T.11N.
T.12N.
T.13N.
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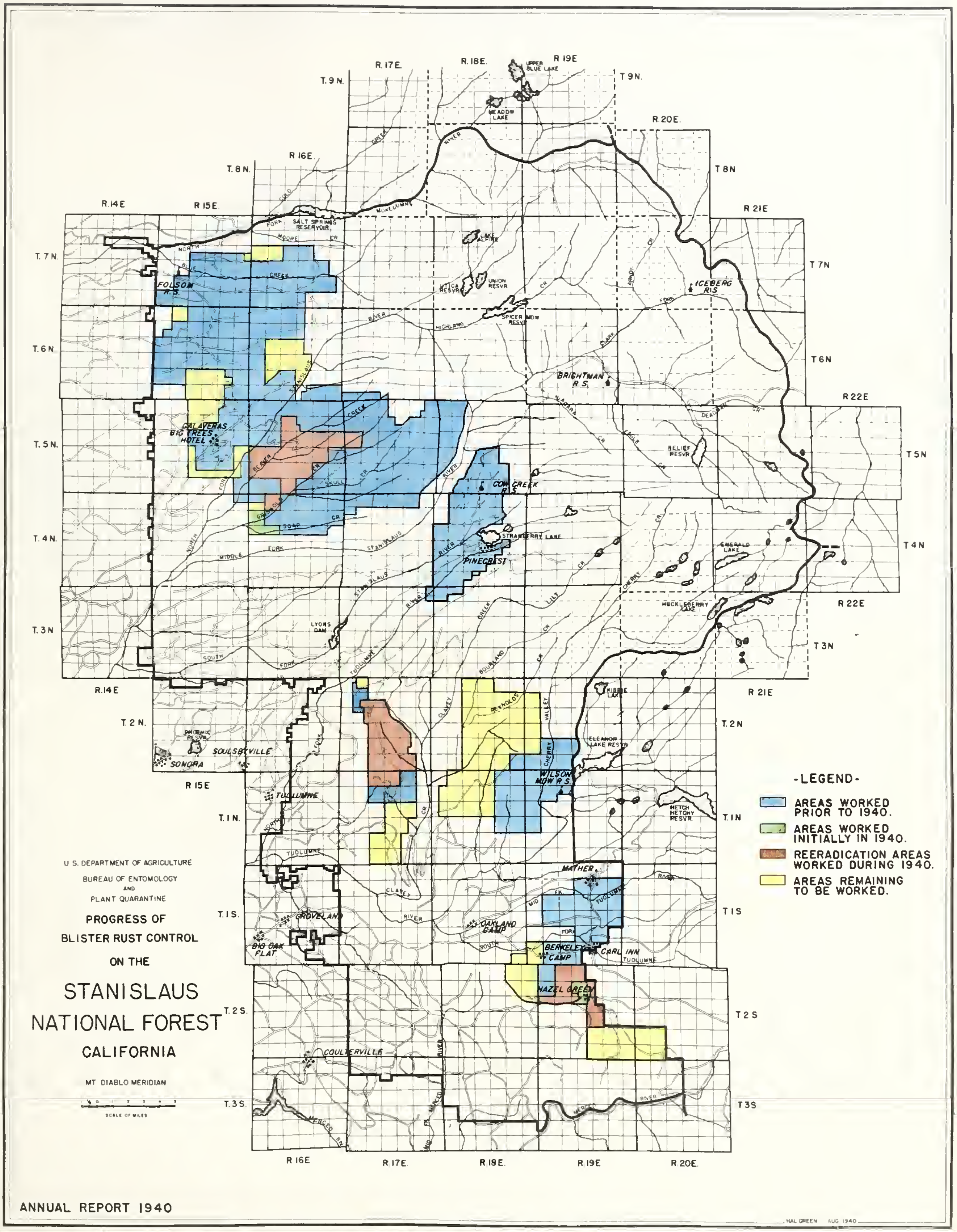
T.15N.
ANNUAL REPORT 1940
HAL GREEN AUG 1940
OAKLAND, CALIFORNIA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BUREAU OF ENTOMOLOGY
AND
PLANT QUARANTINE
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BLISTER RUST CONTROL
ON THE
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NATIONAL FOREST
CALIFORNIA
MT DIABLO MERIDIAN
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REERADICATION AREAS WORKED DURING 1940.
AREAS REMAINING TO BE WORKED.
ANNUAL REPORT 1940
HAL GREEN AUG 1940
FOLSOM R.S.
CALAVERAS BIG TREES HOTEL
COW CREEK R.S.
STRAWBERRY LAKE
PINECREST
BRIGHTMAN R.S.
ICEBERG R.S.
SALT SPRINGS RESERVOIR
LAKE ALPINE
UTICA RESVR
UNION RESVR
SPICER MDW RESVR
MEADOW LAKE
UPPER BLUE LAKE
RELIEF RESVR
EMERALD LAKE
HUCKLEBERRY LAKE
LYONS DAM
KIBBIE LAKE
ELEANOR LAKE RESVR
HETCH HETCHY RESVR
WILSON MDW R.S.
SONORA
SOULSBYVILLE
PHOENIX RESVR
TUOLUMNE
GROVELAND
BIG OAK FLAT
OAKLAND CAMP
MATHER
BERKELEY CAMP
CARL INN
HAZEL GREEN
COULTERVILLE
R.14E
R.15E.
R.16E.
R.17E.
R.18E.
R.19E
R.20E.
R.21E
R.22E
T.9N.
T.8N.
T.7N.
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T.4N.
T.3N.
T.2N.
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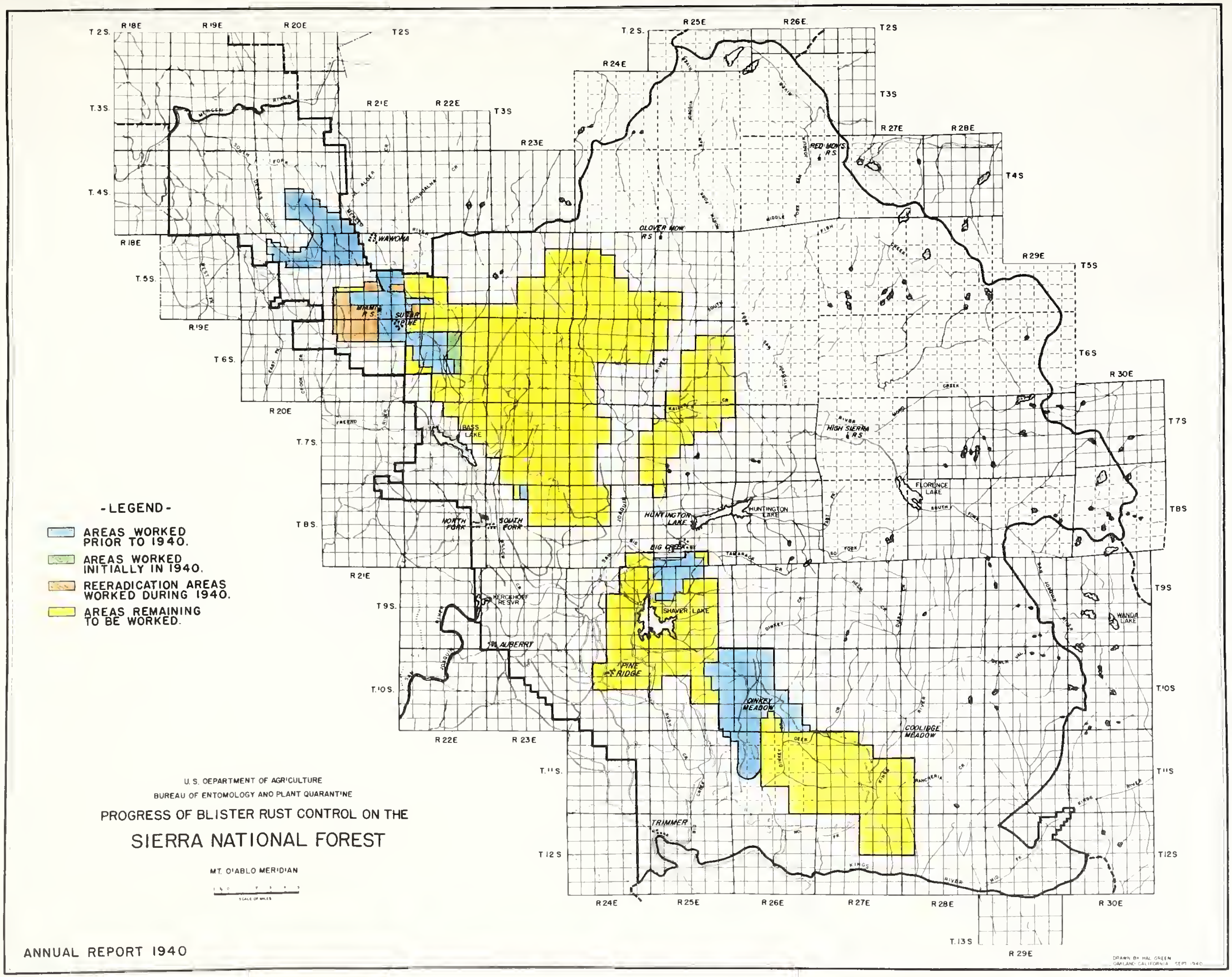
T.1S.
T.2S.
T.3S.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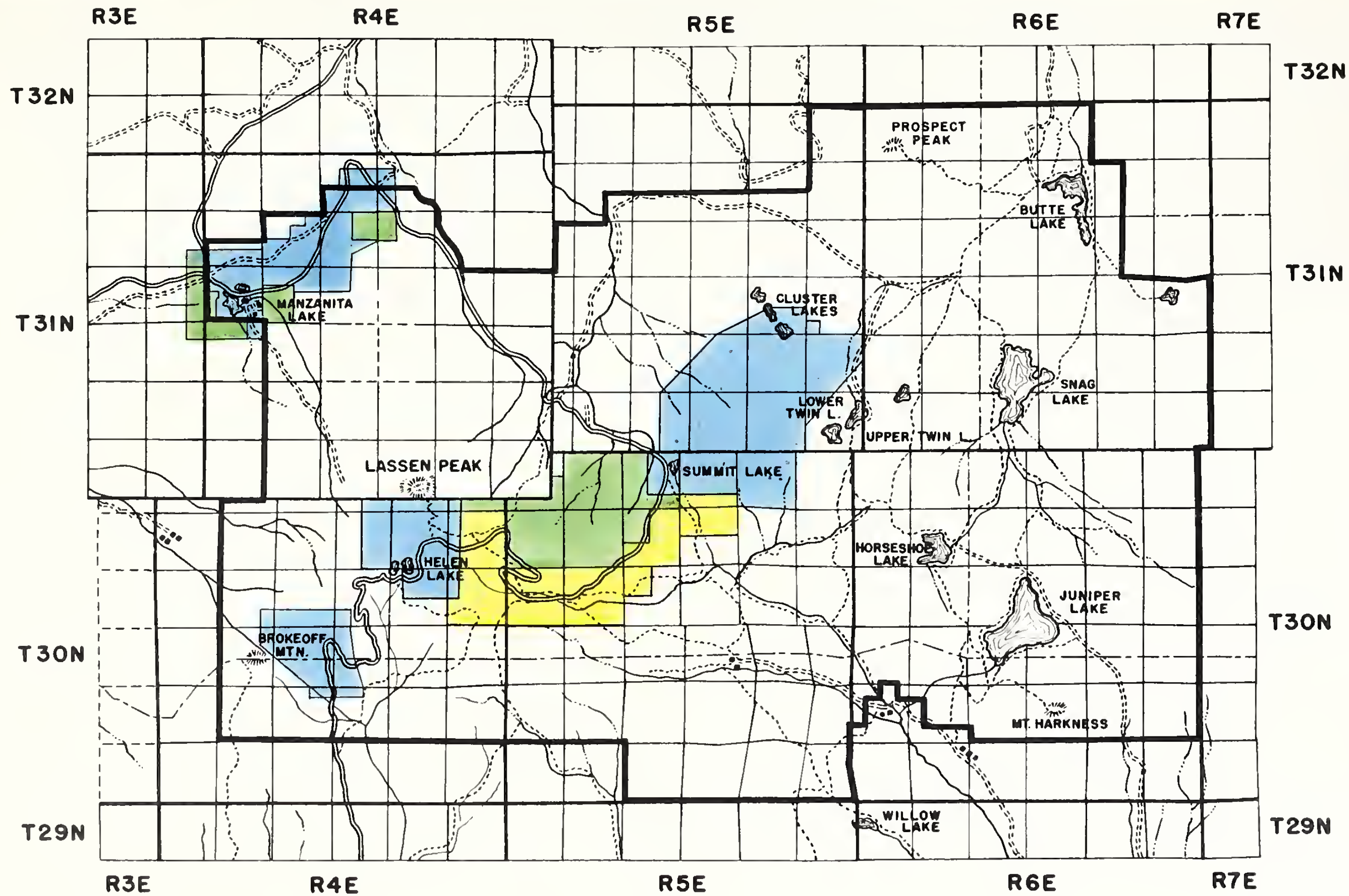
U. S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
SIERRA NATIONAL FOREST
MT. DIABLO MERIDIAN
ANNUAL REPORT 1940
WAWONA
SUGAR PINE
BASS LAKE
NORTH FORK
SOUTH FORK
HUNTINGTON LAKE
BIG CREEK
SHAVER LAKE
PINE RIDGE
DINKEY MEADOW
COOLIDGE MEADOW
TRIMMER
AUBERRY
KERCKHOFF RESVR
CLOVER MDW R.S.
RED MDWS R.S.
HIGH SIERRA R.S.
FLORENCE LAKE
WANDA LAKE



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AREAS WORKED INITIALLY IN 1940

AREAS WORKED PRIOR TO 1940

AREAS REMAINING TO BE WORKED

U. S. DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

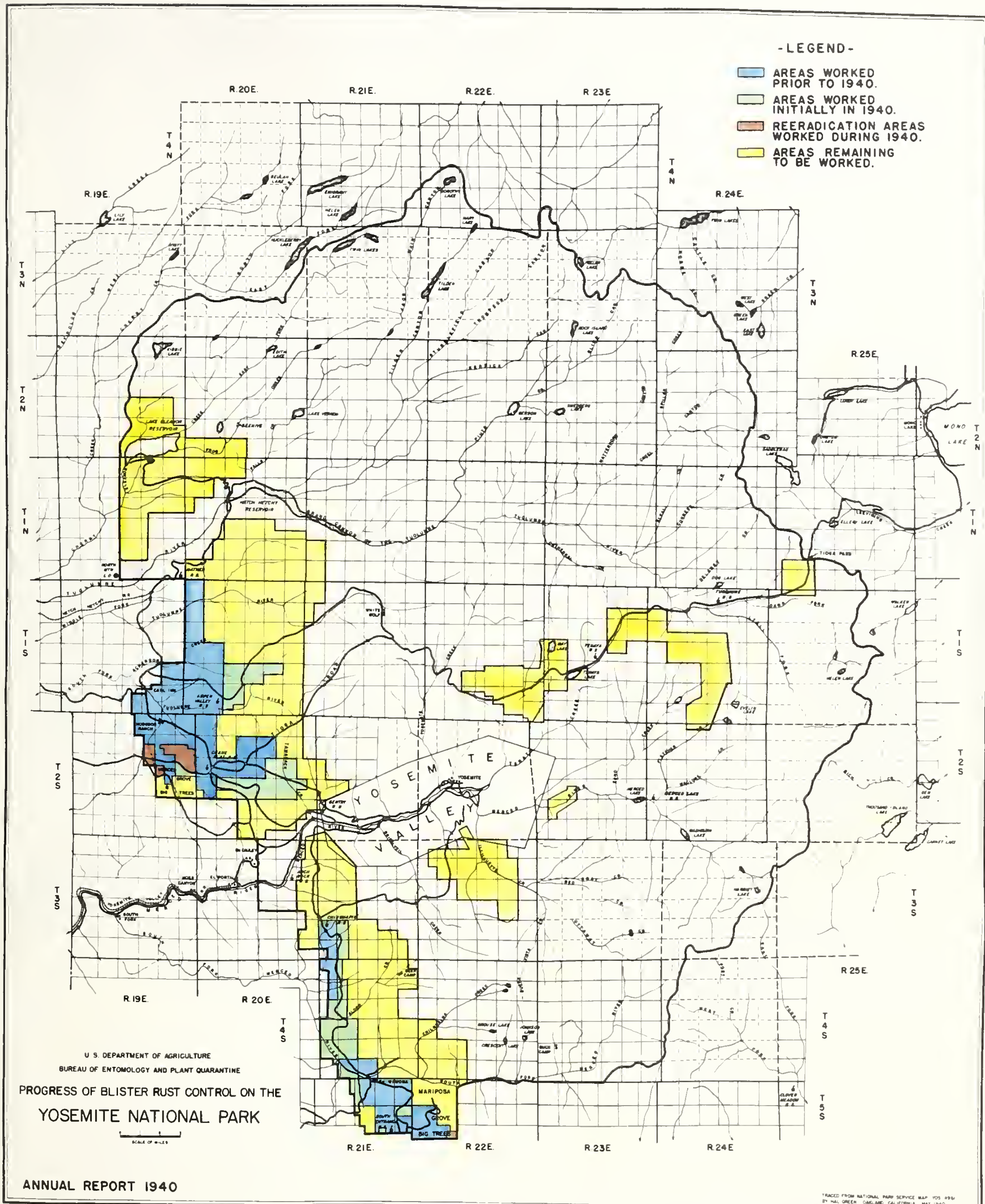
PROGRESS OF BLISTER RUST CONTROL ON THE

LASSEN VOLCANIC NATIONAL PARK.

SCALE MILES 1 ½ 0 1 2 -CALIFORNIA- MT. DIABLO MERIDIAN.

ANNUAL REPORT 1940
BENTON HOWARD

H.E.G. NOV. 1938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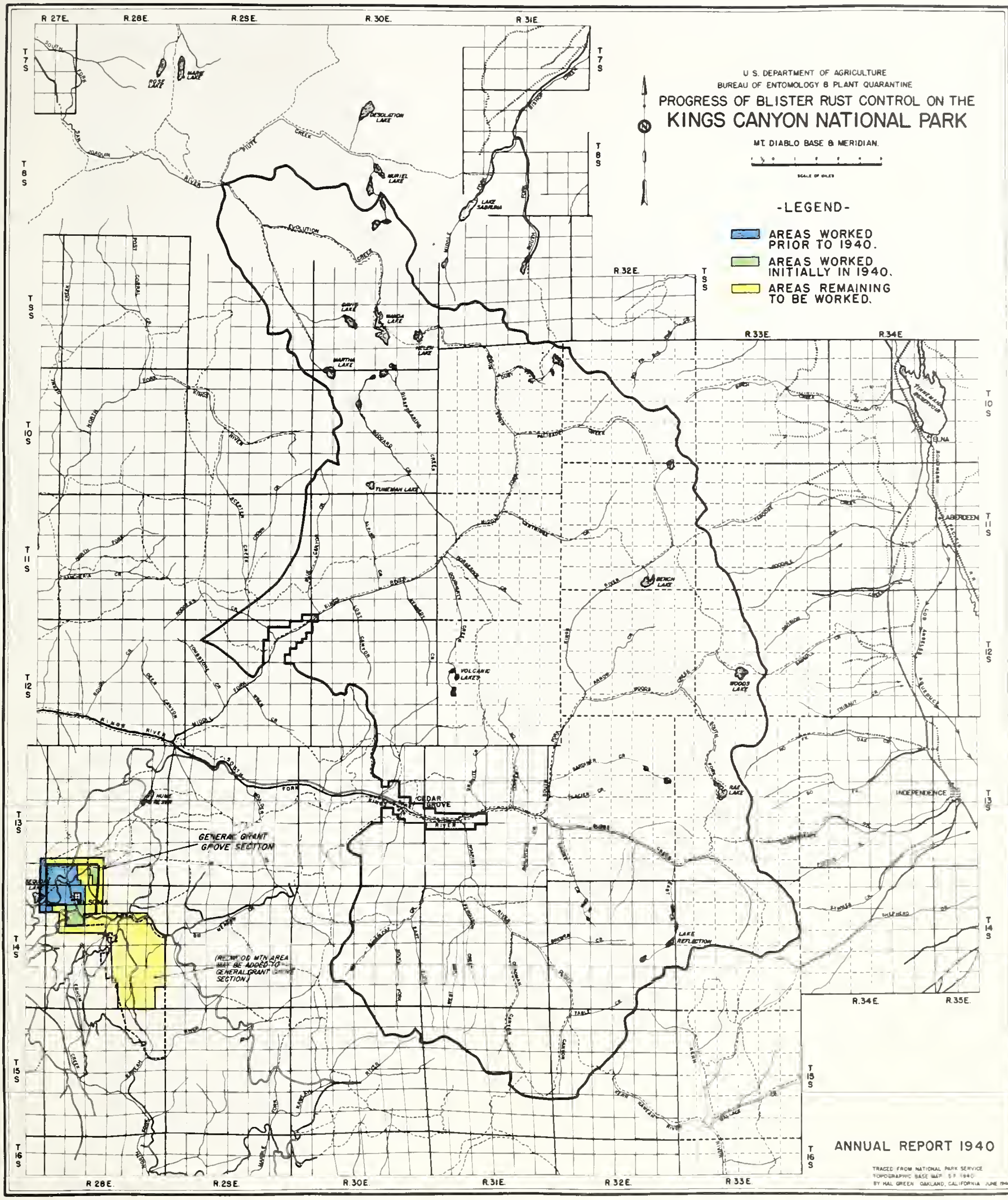
YOSEMITE VALLEY
MONO LAKE
MARIPOSA GROVE BIG TREES
U.S. DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
YOSEMITE NATIONAL PARK
ANNUAL REPORT 1940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BUREAU OF ENTOMOLOGY & PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
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MT. DIABLO BASE & MERIDIAN.
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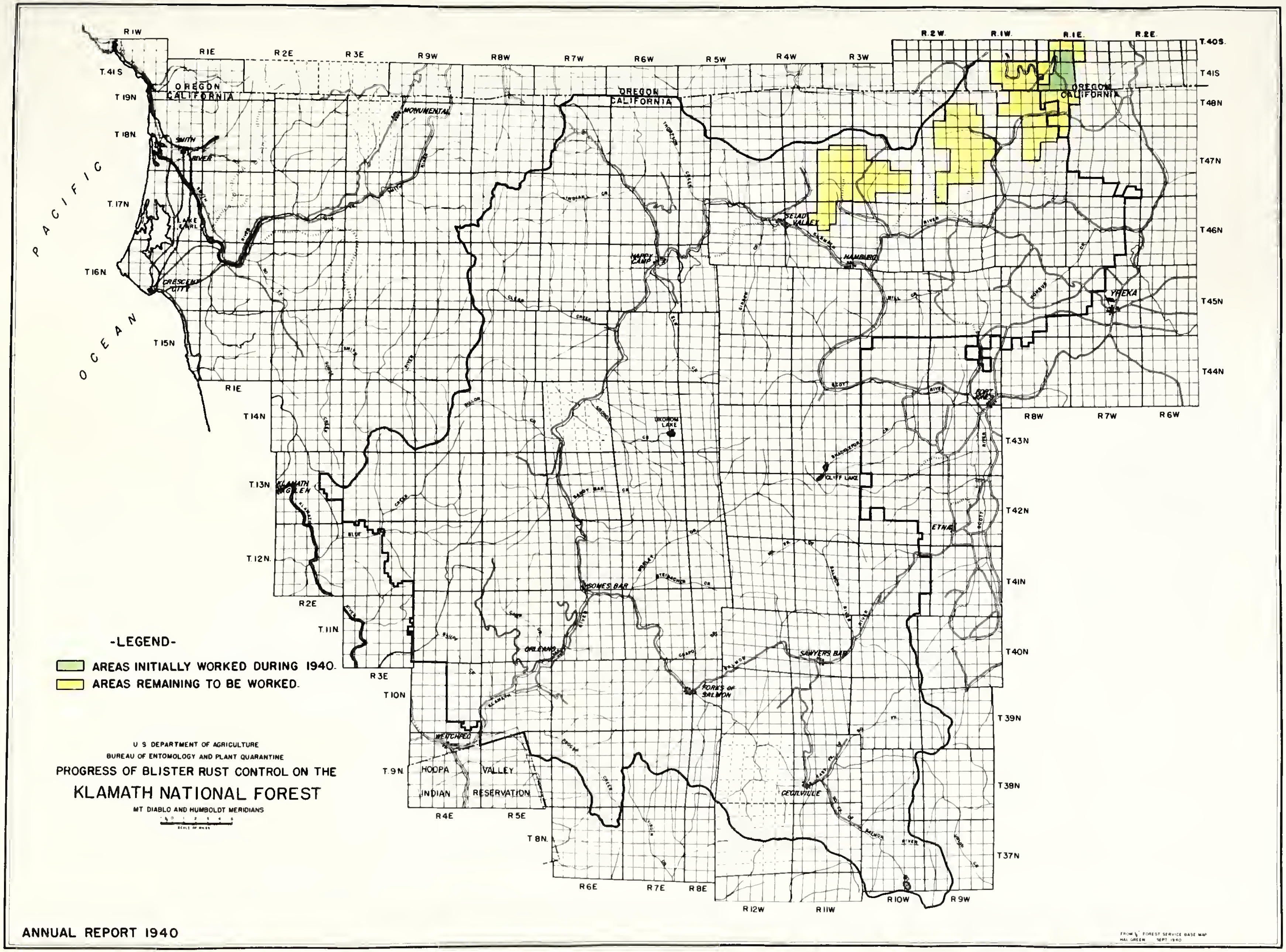
AREAS WORKED PRIOR TO 1940.
AREAS WORKED INITIALLY IN 1940.
AREAS REMAINING TO BE WORKED.
GENERAL GRANT GROVE SECTION
(REDWOOD MTN AREA MAY BE ADDED TO GENERAL GRANT GROVE SECTION)
CEDAR GROVE
INDEPENDENCE
ANNUAL REPORT 1940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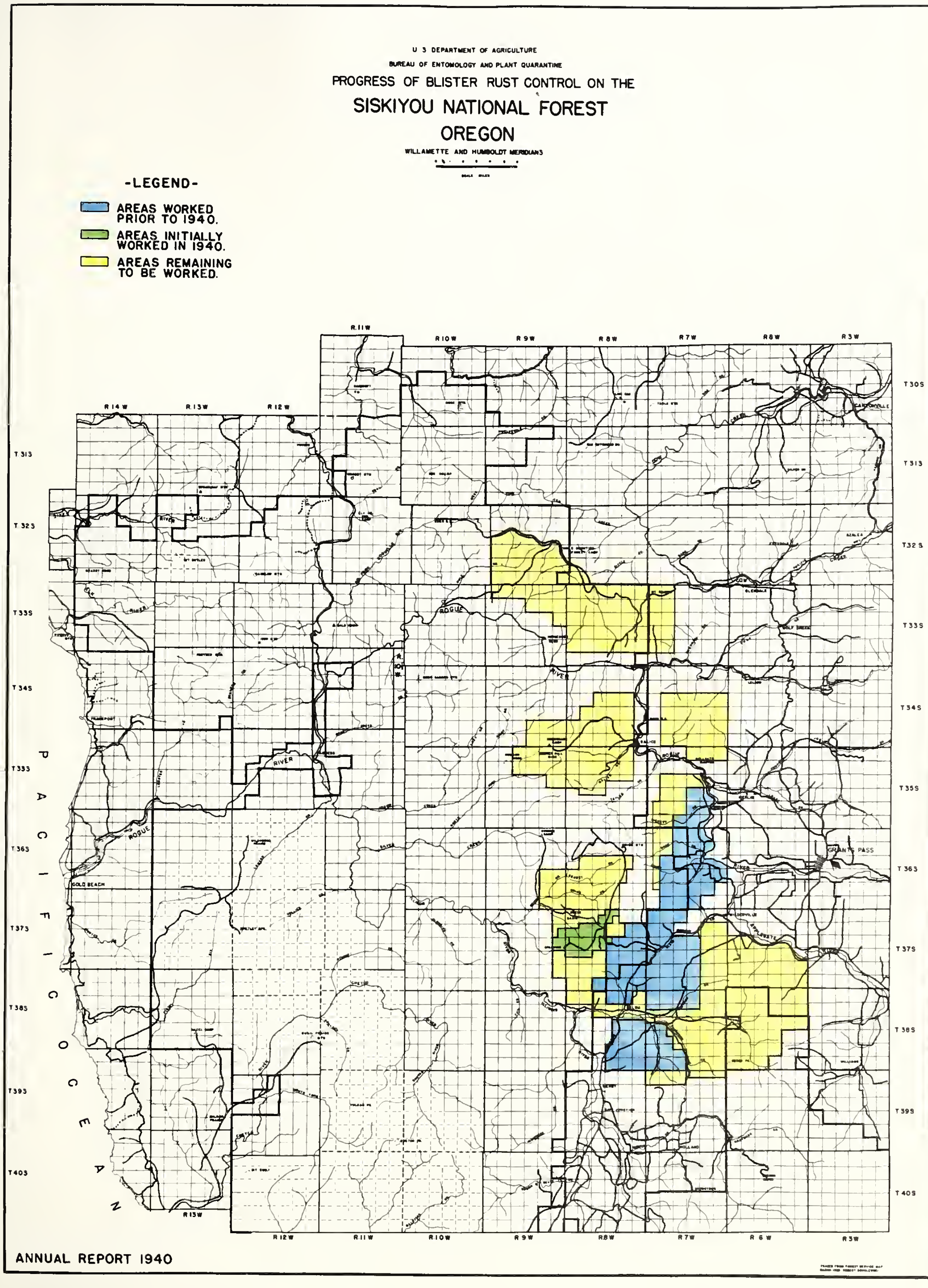
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
KLAMATH NATIONAL FOREST
MT DIABLO AND HUMBOLDT MERIDIANS
ANNUAL REPORT 1940
PACIFIC OCEAN
OREGON
CALIFORNIA
YREKA
SEIAD VALLEY
HAMBURG
HAPPY CAMP
CRESCENT CITY
SMITH RIVER
MONUMENTAL
ETNA
CLIFF LAKE
SOMES BAR
ORLEANS
SAWYERS BAR
FORKS OF SALMON
CECILVILLE
WEITCHPEC
HOOPA VALLEY INDIAN RESERVATION
KLAMATH GLEN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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
PROGRESS OF BLISTER RUST CONTROL ON THE
SISKIYOU NATIONAL FOREST
OREGON
WILLAMETTE AND HUMBOLDT MERIDIANS
-LEGEND-
AREAS WORKED PRIOR TO 1940.
AREAS INITIALLY WORKED IN 1940.
AREAS REMAINING TO BE WORKED.
PACIFIC OCEAN
ROGUE RIVER
GRANTS PASS
GOLD BEACH
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BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

PROGRESS OF BLISTER RUST CONTROL ON THE

CRATER LAKE NATIONAL PARK
OREGON

WILLAMETTE MERIDIAN

1 ½ 0 1
SCALE MILES

-LEGEND-

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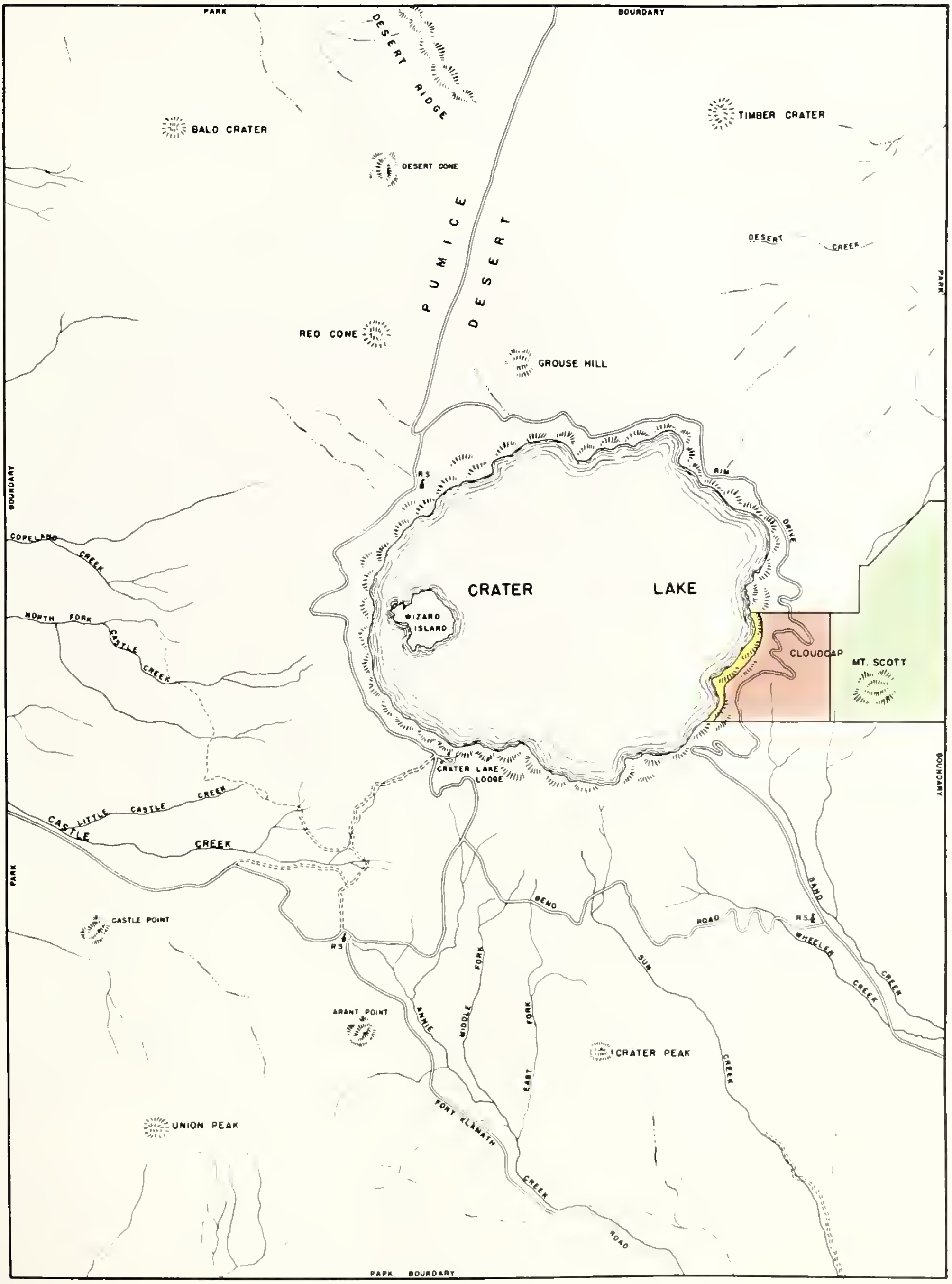
- AREAS WORKED INITIALLY IN 1940.
- REERADICATION AREAS WORKED DURING 1940.
- AREAS REMAINING TO BE WORKED.



MT. HEBO EASTERN WHITE PINE PLANTING

BLISTER RUST CONTROL UNIT

SIUSLAW NATIONAL FOREST

-OREGON-

TOWNSHIP 4 SOUTH - RANGE 9 WEST

-WILLAMETTE MERIDIAN-

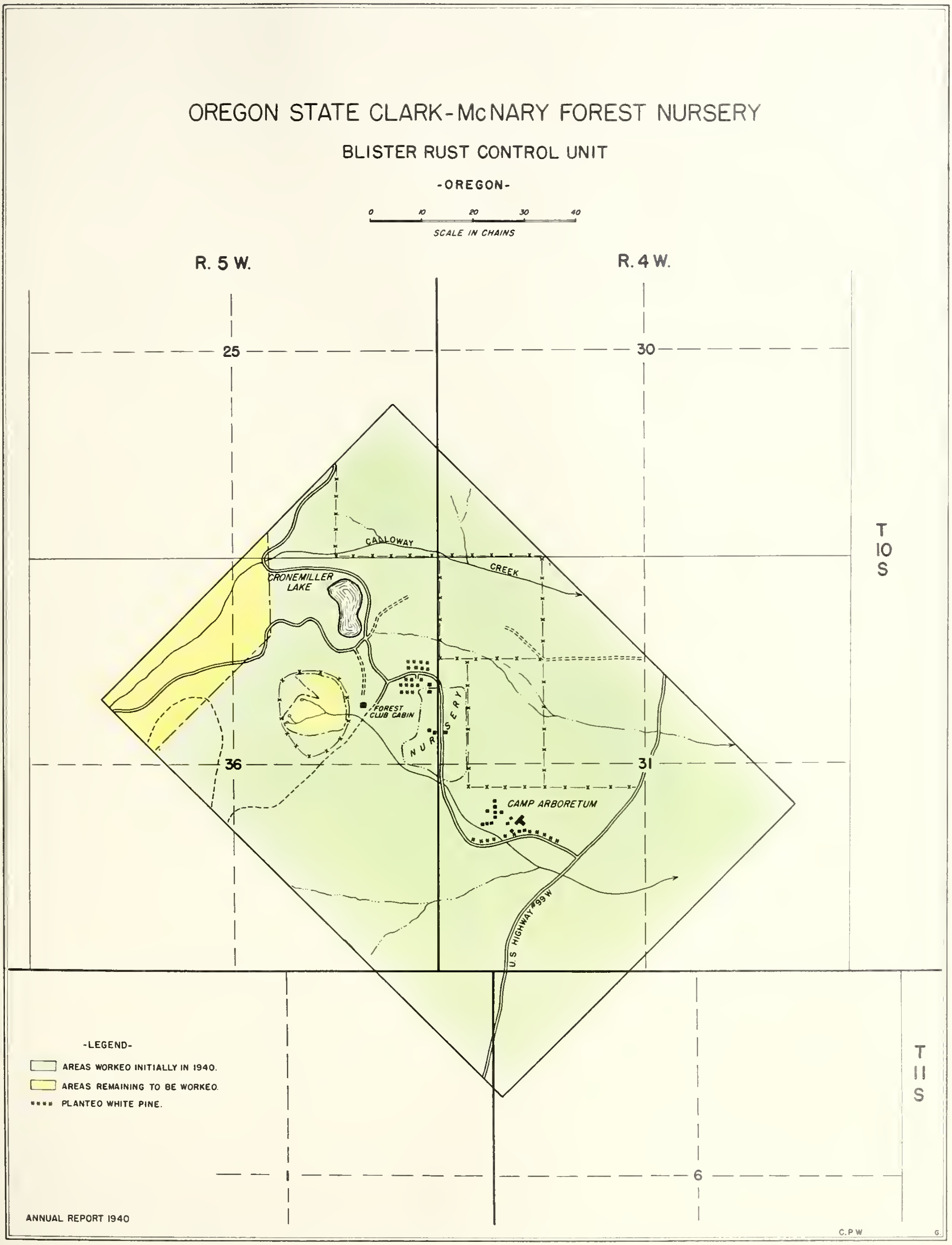
-LEGEND-

AREAS WORKED INITIALLY IN 1940.

REERADICATION AREAS WORKED DURING 1940.

ANNUAL REPORT 1940.

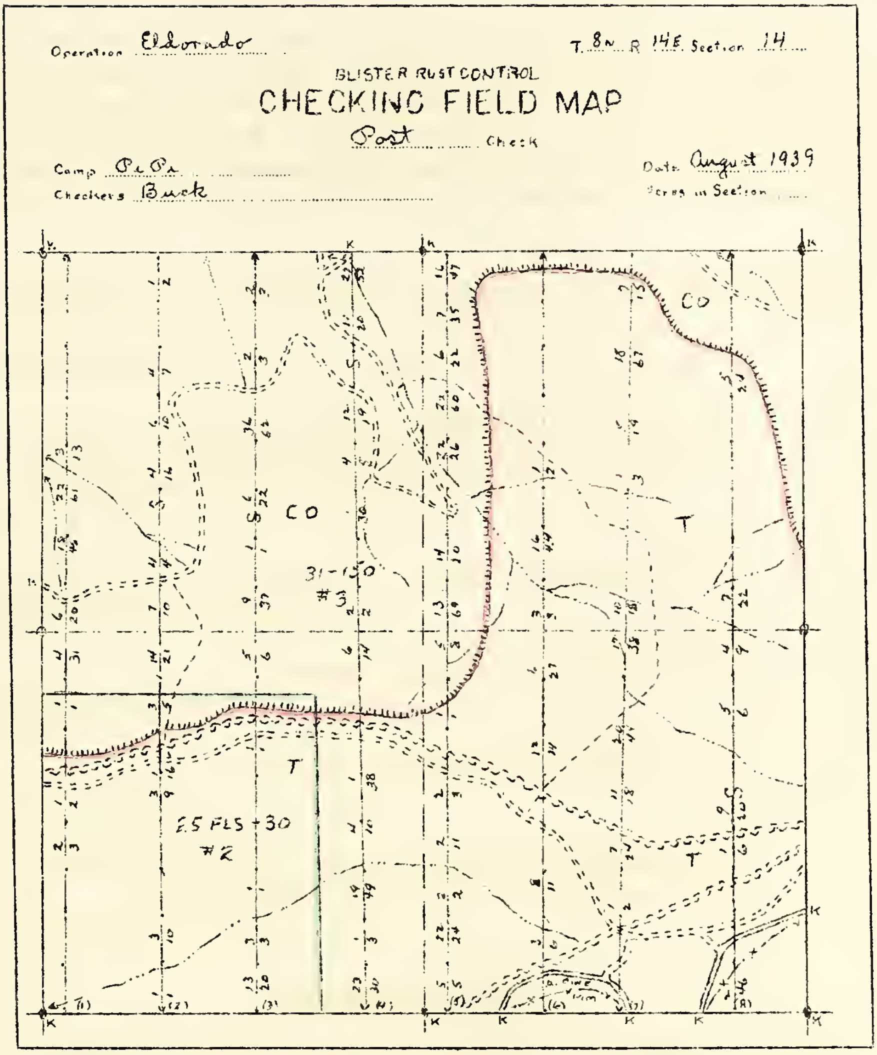
C. P. W. 6.


OREGON STATE CLARK-McNARY FOREST NURSERY
BLISTER RUST CONTROL UNIT
-OREGON-
0 10 20 30 40
SCALE IN CHAINS
R. 5 W.
R. 4 W.
25
30
T 10 S
CALLOWAY
CREEK
CRONEMILLER LAKE
FOREST CLUB CABIN
NURSERY
36
31
CAMP ARBORETUM
U.S. HIGHWAY #99 W
T 11 S
6
-LEGEND-
AREAS WORKED INITIALLY IN 1940.
AREAS REMAINING TO BE WORKED.
PLANTED WHITE PINE.
ANNUAL REPORT 1940
C.P.W.

PART III - CHECKING

By

S. Daryl Adams, Agent



The major portion of the 1940 checking season was devoted to post and regular checking on reeradication areas. Since the data collected on advance and post checks are of great importance in planning a future eradication program, it is the aim of the checking organization to conduct these checks the year prior to Ribes eradication insofar as the availability of checkers permits. Each operation now has a fair amount of advance or post check data from which the 1941 work plans can be made.

ORGANIZATION AND ADMINISTRATION

The checking personnel was organized in the same manner as that for 1939. The Bureau's regional checking supervisor, assisted by six full-time checking supervisors, directed the work of all checkers hired by the three cooperating agencies: the Forest Service, the National Park Service, and the Bureau of Entomology and Plant Quarantine. The number of men employed by each agency and their titles and rates of pay are presented in Table 1.

The plan established in 1939 for employing regular fund checkers was successfully continued during 1940. Under this plan the Bureau hired all checkers, paid their salaries, and was reimbursed by the Forest Service for checking done on Federal land. National Park Service checkers and checkers employed in connection with Forest Service ERA and CCC camps were selected by the checking supervisors and paid by the agencies involved.

The six full-time checking supervisors were assigned as follows:

The Oregon Operation -............Lyle N. Anderson

The Lassen Volcanic National Park,
The Lassen National Forest, and the northern
part of the Plumas National Forest -
.............John C. Crowell

The southern part of the Plumas National Forest -
..............S. Daryl Adams

The Eldorado National Forest -
..............Carl W. Fowler

The Stanislaus National Forest -
..............Glenn J. Taylor

The Sierra National Forest, Yosemite National Park,
and Kings Canyon National Park -
..............John N. Mitchell

CHECKING METHODS

Checking methods for 1940 remained unchanged except for the method of recording Ribes seedlings. The definition of a seedling was broadened to include all Ribes bushes three years old or less. The live stem was recorded by the checker only when it exceeded six inches. All classes of checking were performed as described in the 1940 Checking Manual. Additional information, such as noting fruiting bushes and plotting _Ribes cereum_ separately, was shown on some operations at the request of the **technical** supervisor.

In order to maintain precision in checking procedure, the system of rerunning a number of original strips by the checking supervisor,

accompanied by the checker, was continued advantageously during 1940. This method appears to be the most effective means of inspecting the actual field work of the checker.

DESCRIPTION OF CHECKING FIELD ACTIVITIES

California

During 1940, checking on the Plumas National Forest was conducted under the supervision of two checking supervisors; but inasmuch as checkers were frequently transferred between camps and between the Plumas and Lassen National Forests the results for the two forests have been combined in this report.

One checker foreman was employed to supervise, primarily, the post check work. When the post check was completed on the southern Plumas in July, the checker foreman and a number of checkers were transferred to the northern part of the forest. The major part of all checker man days was devoted to post and regular checking on reeradication areas.

Checking on the Lassen National Forest began when the Deer Creek CCC Camp opened early in June. After one month this camp ceased working on the blister rust control project, and work began at the Soda Springs CCC Camp. Owing to a shortage of funds the checkers were released in September leaving 1,901 acres unchecked.

On the Eldorado National Forest all checking activities were carried on from the established eradication camps. The location of the four Forest Service camps on the southern end of the forest was such that all checkers worked out of the base camp under the direct supervision of a junior checker foreman. This grouping of checkers in one camp, whenever possible, has several advantages. It permits better supervision, which increases production and accuracy of results, and which eliminates the big problem of transportation in ERA camps where the checkers' field day is longer than that of the eradication crews. In addition to checking areas worked in 1940 an effort was made to build up a reserve of advance and post check areas for future work.

Checking on the Stanislaus National Forest was confined mainly to post and regular check on reeradication areas. However, 11,000 acres on the Strawberry Unit were post checked by Forest Service checkers for the 1941 field season. Considerable staff compass and chaining control in conjunction with the checking facilitated the speed and accuracy of the checking work in a number of townships having highly irregular sections. This control work also aids in the improvement of permanent records.

All checking on the Sierra National Forest was performed by three checkers. No special advance or post check parties were necessary, as all areas were readily covered from the established eradication camps. About 2,000 acres have been post checked in advance of the eradication crews.

Heavy snowpacks in the Lassen Volcanic National Park delayed the opening of the blister rust control operation until June. Since an advance check had been made on the control unit during 1939, there was no immediate need for a checker; consequently none was employed until July 10. One senior checker performed the work required during the season, dividing his time on the areas worked by the Lost Creek and the Mineral CCC Camps. Checking work was facilitated by such favorable conditions as good weather, ready accessibility of the areas by good roads and sufficient transportation. The field work ended on September 13 owing to a shortage of funds, thereby leaving 1,123 acres covered by eradication but unchecked.

On the Yosemite National Park eight sections were advance checked from a pack camp located at Smith Meadows. This area, which is in good virgin sugar pine type along the southern rim of the Grand Canyon of the Tuolumne near Hetch Hetchy, will be worked when the National Park Service obtains regular funds for blister rust control work. The area has many trails and the topography is gentle, although many brush fields of moderate density occur. In general, the declining Ribes population is light to medium, although none of the area is Ribes free. All section lines were run with staff compass and chain, thereby locating nearly all the public survey corners. Numerous location posters were put up to expedite future work. At present there are about 25,000 acres of advance check reserve on Yosemite National Park, but no post check reserve.

Advance checking was started in the Redwood Mountain Addition to the General Grant Grove Section of Kings Canyon National Park. The reserve for future work consists of 2,700 acres of advance and 600 acres of post check.

Oregon

Checking work in Oregon was conducted on the Rogue River, Siskiyou, and Klamath National Forests, the Mt. Hebo Plantation on the Siuslaw National Forest, the McDonald State Forest, and Crater Lake National Park.

On the Pinehurst area of the Rogue River National Forest a post checking camp was established on July 12 and operated for six weeks, during which time 14,036 acres of the total 55,000 in the unit were post checked. A checker foreman was in charge of the party, which consisted of four checkers and a cook.

There were 499 acres unchecked at the close of the season on the Siskiyou National Forest, because this area was completed by the eradication crews on the last day the camp operated. The Siskiyou now has about 4,000 acres of advance check reserve. All regular checking was completed on the Klamath National Forest, and in addition, an advance check was conducted on an area of 2,700 acres.

Work on the Mt. Hebo Plantation consisted of post and regular checking on the reeradication area. The upland on this area is Ribes free, but the stream type showed a rapid regeneration of <u>Ribes bracteosum</u>,

which will necessitate future eradication work.

The McDonald State Forest includes the Oregon State College, School of Forestry Arboretum, which supports a number of planted five-needled pines, and the Oregon State Clark-McNary Nursery. Eradication work was done on 44 acres following the post check, which consisted of a 10 percent check on all areas adjacent to the five-needled pine plantings.

In the Crater Lake National Park 945 acres were post and regular checked on the Cloud Cap reeradication area, which was initially worked in 1937.

WORK PERFORMED AND RESULTS OBTAINED

Explanation of Tables

Table 1 is a summary of men employed by each agency showing their titles and rates of pay. The results for all classes of checking are presented in Tables 2 to 5, inclusive. Tables 2 and 5 give a summary of regular checking results; Table 3 summarizes advance and post checking; and Table 4 gives an analysis of checking cost and production.

In Table 2 under the heading "Acres Covered by Final Check" is shown the number of acres on which a final regular check was performed. The figures for the Stanislaus and Sierra National Forests include respectively, 2,638 acres and 83 acres which were worked and claimed by eradication in 1939 and checked in 1940. In the adjacent column appear the acres on which Ribes eradication work was done but on which no final check was performed. Areas that were reworked but not rechecked are included in this column. The percentage of check was computed by dividing the acres in check strips by the acres covered by final check. Included under "Man Days" are all man days actually spent running check strips and proportional amounts of training, travel, office and checker foreman time. The total number of man days spent on training, travel, office and supervision (checker foremen) was prorated to the three classes of checking in proportion to the number of man days of field work done in each class. The time of the checking supervisors, annual and sick leave, and off duty time of the checkers is not included in this report.

Table 3 is a summary of advance and post checking results. The columns headed "Acres Covered" give the total number of acres to which the sample applies. In sections where a check less than five percent was sufficient to establish the population classes, all acres in the section were claimed. "Man Days" includes all time actually spent running strips and proportional amounts of training, travel, office and checker foreman time.

The results attained per man day and the cost of checking are shown in Table 4. In the column headed "Effective Man Days" the figures for all classes of checking were obtained from Tables 2 and 3, the man days spent on "Eradication" and "Fire" were obtained from the checkers' time

summaries. "Strip Acres" includes the total acreage of all check strips. In the case of regular checking all first check strip acres and recheck strip acres are included. "Strip Acres per Checker Man Day" were computed on the basis of total man days exclusive of checker foremen. "Strip Acres per Checker Field Man Day" were computed on the basis of man days actually spent on check strips.

The "Total Cost" for each operation includes the gross salaries of all checkers and checker foremen and the cost of operating all pickups (at four cents per mile) that were used on the checking project. The cost figure for Oregon includes $167.00 which was used to employ a cook for the Pinehurst post checking party. The cost of each "Activity" was computed on the basis of the "Percent of Total" shown under "Effective Man Days." The "Cost per Acre Basis of Acres Covered by Check" was computed from the cost figure in the preceding column and the acreage figures in Tables 2 and 3.

Table 5 is an analysis of all regular checking. Under "All Regular Checks" the "Man Days" and "Total Cost" were obtained from Table 4. The acreage for first check includes all areas on which a first check was performed. Since a number of areas received a first check but no final check, this figure exceeds "Acres Covered by Final Check" in Table 2.

Analysis and Discussion of Results

Table 2

During 1940 the eradication crews covered 148,024 acres. A final regular check was completed on 127,523 acres, which is 86 percent of the total area. The remaining 20,501 acres were left unchecked owing to the following reasons: (1) the early defoliation of Ribes bushes on many areas made final checking impracticable; (2) inclement weather hampered checking progress at the close of the season; and (3) on some areas eradication work was not completed until the last day the camp operated. Areas that received a first regular check and were reworked but not rechecked are included in the unchecked acreage. A final regular check was conducted on an additional 2,721 acres that were worked and claimed in 1939, making a total of 130,244 acres for 1940.

Table 3

In accordance with the 1940 reeradication work plan, 118,787 acres were post checked. On initial eradication areas 93,099 acres were advance checked. On reeradication areas a 3.8 percent check was necessary in order to delimit Ribes-free areas and establish the Ribes population classes, whereas, on initial eradication areas a 3.1 percent check was sufficient.

Table 4

A total of 5,935 6/8 man days, or 93.5 percent of the total effective man days, were spent on checking. Less time was spent this year on eradication and fire suppression than in any previous year. The number of strip acres covered on regular check per checker man day was the same

as that for 1939. The output on post check, 2.9 strip acres per checker man day, was the same as that for advance check because of the similarity of the areas checked. For 1939 the corresponding figures were 3.3 strip acres per checker man day on advance check and 2.6 on post check.

The cost per acre on the basis of acres covered by check was less during 1940 for each of the three classes of check than it was for the previous year. In the case of advance check, although the cost per strip acre is higher than that for 1939, the cost per acre on basis of acres covered by check is less because in 1940 a 3.1 percent check was sufficient to determine the Ribes population classes, whereas in 1939 a 4.0 percent check was necessary.

The average cost per effective checker man day in the Sugar Pine Region during 1940 was $6.38.

Table 5

Of the 135,015 acres receiving a first regular check, 36,798 acres, or 27.3 percent of the original, required rechecking. This is 4.7 percent less than the percent rechecked in 1939.

The difference in cost of recheck over first regular check was increased from 1.1 cents in 1939 to 1.6 cents in 1940. The additional expense involved in conducting a recheck is explained by the fact that recheck blocks are usually small and isolated, necessitating a high proportion of travel time in relation to actual checking time. This is particularly true on a reeradication program. The average cost per acre was 0.4 cents less for first check and all regular checks and 0.1 cent higher for rechecks than in 1939. The cost of regular checking in the Sugar Pine Region during 1940 was 12.1 cents per acre.

CONCLUSION

Since the checking methods employed during the 1940 season have satisfactorily obtained and presented the data required by the eradication supervisors, no outstanding changes in checking procedure are planned for the 1941 season. The desired goal has not yet been reached in personnel procedure and administration, but each season offers improved methods which tend to solve more and more of these problems. An objective of the checking organization is to eliminate difficulties in these fields, in order that maximum efficiency can be attained in this important phase of the blister rust control program.

TABLE 1

SUMMARY OF CHECKING PERSONNEL IN THE SUGAR PINE REGION - 1940

Operation	Number of Men Employed by Each Agency					Junior Checker Foreman		Checker Foreman		Senior Checkers		Junior Checkers		Total Number of Men Employed
	Bureau and Forest Service REG.	Bureau ERA	Forest Service ERA	Forest Service CCC	Nat'l Park Service CCC	No.	Annual Rate	No.	Annual Rate	No.	Annual Rate	No.	Annual Rate	
Oregon	3	5	-	-	-	1	$1800	-	-	2	$1680	5	$1440	8
Plumas and Lassen National Forests	19	5	4	-	-	-	-	1	$2000	10	1620	17	1440	28
Eldorado National Forest	14	5	-	1	-	1	1800	-	-	4	1620	15	1440	20
Stanislaus National Forest	9	5	-	-	-	-	-	-	-	3	1620	11	1440	14
Sierra National Forest	3	-	-	-	-	-	-	-	-	1	1620	2	1440	3
Lassen Volcanic National Park	-	-	-	-	1	-	-	-	-	1	.75*	-	-	1
Yosemite National Park	-	-	-	-	9	-	-	1	.85*	2	.75*	6	.67*	9
Kings Canyon National Park	-	-	-	-	1	-	-	-	-	1	.75*	-	-	1
Sugar Pine Region	48	20	4	1	11	2	-	2	-	24	-	56	-	84

*Hourly Rate

TABLE 2

SUMMARY OF REGULAR CHECKING IN THE SUGAR PINE REGION - 1940

Operation	Acres Covered by Final Check	Acres Unchecked	Percent of Check	Man Days
Oregon	9,132	147	5.1	213
Plumas and Lassen National Forests	46,608	5,796	5.0	1,216-2/8
Eldorado National Forest	31,464	7,176	4.8	877
Stanislaus National Forest	21,381	5,093	4.8	527-4/8
Sierra National Forest	8,632	-	4.7	135
Lassen Volcanic National Park	778	1,123	5.4	12
Yosemite National Park	11,964	670	5.2	287-2/8
Kings Canyon National Park	285	496	5.0	6
Sugar Pine Region	130,244	20,501	4.9	3,274

TABLE 3

SUMMARY OF ADVANCE AND POST CHECKING IN THE SUGAR PINE REGION - 1940

Operation	Advance Check			Post Check		
	Acres Covered	Percent of Check	Man Days	Acres Covered	Percent of Check	Man Days
Oregon	18,151	3.5	199-7/8	15,661	4.6	198-3/8
Plumas and Lassen National Forests	21,926	3.4	312	49,695	4.1	674-4/8
Eldorado National Forest	24,234	2.6	232-2/8	20,276	3.3	284-3/8
Stanislaus National Forest	1,908	3.3	20-4/8	24,258	3.3	349-2/8
Sierra National Forest	-	-	-	8,263	3.1	85-4/8
Lassen Volcanic National Park	1,400	4.4	15-3/8	-	-	-
Yosemite National Park	22,687	2.9	258-6/8	-	-	-
Kings Canyon National Park	2,793	2.4	25-6/8	634	2.5	5-2/8
Sugar Pine Region	93,099	3.1	1,064-4/8	118,787	3.8	1,597-2/8

TABLE 4

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1940

Operation	Activity	Effective Man Days: Number	Effective Man Days: Percent of Total	Strip Acres	Strip Acres Per Checker Man Day	Strip Acres Per Checker Field Man Day	Total Cost	Cost Per Acre Basis of Acres Covered by Check	Cost Per Strip Acre
Oregon	Regular Checking	213	34.8	620.1	3.0	3.4	$1,432.06	$.157	$2.31
	Advance Checking	199 7/8	32.7	632.2	3.2	3.7	1,343.82	.074	2.13
	Post Checking	198 3/8	32.5	722.6	3.7	4.2	1,333.73	.085	1.85
	Total - - -	611 2/8	100.0	1,974.9	3.3	3.7	4,109.61	.089	2.08
Plumas and Lassen National Forests	Regular Checking	1,216 2/8	52.6	3,105.2	2.7	3.0	7,771.12	.167	2.50
	Advance Checking	312	13.5	745.8	2.5	2.8	1,994.49	.091	2.67
	Post Checking	674 4/8	29.2	2,046.5	3.2	3.5	4,314.01	.087	2.11
	Eradication	69 4/8	3.0	-	-	-	443.22	-	-
	Fire	40 5/8	1.7	-	-	-	251.16	-	-
	Total - - -	2,312 7/8	100.0	5,897.5	-	-	14,774.00	-	-
Eldorado National Forest	Regular Checking	877	62.2	2,078.0	2.5	2.8	5,590.95	.178	2.69
	Advance Checking	232 2/8	16.5	640.6	3.0	3.3	1,483.13	.061	2.32
	Post Checking	284 3/8	20.2	663.6	2.5	2.8	1,815.71	.090	2.74
	Eradication	16	1.1	-	-	-	98.88	-	-
	Total - - -	1,409 5/8	100.0	3,382.2	-	-	8,988.67	-	-
Stanislaus National Forest	Regular Checking	527 4/8	56.3	1,310.1	2.5	3.0	3,196.67	.150	2.44
	Advance Checking	20 4/8	2.2	62.8	3.1	3.6	124.91	.065	1.99
	Post Checking	349 2/8	37.3	790.2	2.3	2.7	2,112.19	.087	2.67
	Eradication	39	4.2	-	-	-	244.16	-	-
	Total - - -	936 2/8	100.0	2,163.1	-	-	$5,677.93	-	-

TABLE 4 (CONTINUED)

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1940

Operation	Activity	Effective Man Days		Strip Acres	Strip Acres Per Checker Man Day	Strip Acres Per Checker Field Man Day	Total Cost	Cost Per Acre Basis of Acres Covered by Check	Cost Per Strip Acre
		Number	Percent of Total						
Sierra National Forest	Regular Checking	135	53.0	431.3	3.2	3.7	$ 866.53	$.100	$2.01
	Post Checking	85 4/8	33.6	258.9	3.0	3.5	548.81	.066	2.12
	Eradication	31	12.2	-	-	-	198.98	-	-
	Fire	3	1.2	-	-	-	19.26	-	-
	Total - - -	254 4/8	100.0	690.2	-	-	1,633.58	-	-
Lassen Volcanic National Park	Regular Checking	12	23.1	42.4	3.5	4.2	96.79	.124	2.28
	Advance Checking	15 3/8	29.6	61.7	4.0	4.8	124.02	.089	2.01
	Eradication	24 5/8	47.3	-	-	-	198.19	-	-
	Total - - -	52	100.0	104.1	-	-	419.00	-	-
Yosemite National Park	Regular Checking	287 2/8	40.6	751.4	3.0	3.2	1,821.97	.152	2.42
	Advance Checking	258 6/8	36.5	669.1	3.0	3.2	1,641.20	.072	2.45
	Eradication	162	22.9	-	-	-	1,027.54	-	-
	Total - - -	708	100.0	1,420.5	-	-	4,490.71	-	-
Kings Canyon National Park	Regular Checking	6	9.7	18.3	3.1	4.0	38.93	.137	2.12
	Advance Checking	25 6/8	41.5	67.6	2.6	3.4	167.08	.060	2.47
	Post Checking	5 2/8	8.5	16.0	3.0	4.0	34.07	.054	2.13
	Eradication	25	40.3	-	-	-	162.22	-	-
	Total - - -	62	100.0	101.9	-	-	$ 402.30	-	-

TABLE 4 (CONTINUED)

ANALYSIS OF CHECKING COST AND PRODUCTION IN THE SUGAR PINE REGION - 1940

Operation	Activity	Effective Man Days		Strip Acres	Strip Acres Per Checker Man Day	Strip Acres Per Checker Field Man Day	Total Cost	Cost Per Acre Basis of Acres Covered by Check	Cost Per Strip Acre
		Number	Percent of Total						
All California	Regular Checking	3,061	53.3	7,736.7	2.7	3.0	$19,382.96	$.160	$2.51
	Advance Checking	864 5/8	15.1	2,247.6	2.8	3.1	5,534.83	.074	2.46
	Post Checking	1,398 7/8	24.4	3,775.2	2.8	3.2	8,824.79	.086	2.34
	All Checking -	5,324 4/8	92.8	13,759.5	2.7	3.0	33,742.58	.113	2.45
	Eradication	367 1/8	6.4	-	-	-	2,373.19	-	-
	Fire	43 5/8	0.8	-	-	-	270.42	-	-
	Total - - -	5,735 2/8	100.0	-	-	-	36,386.19	-	-
Sugar Pine Region	Regular Checking	3,274	51.6	8,356.8	2.7	3.0	20,815.02	.160	2.49
	Advance Checking	1,064 4/8	16.8	2,879.8	2.9	3.2	6,878.65	.074	2.39
	Post Checking	1,597 2/8	25.1	4,497.8	2.9	3.3	10,158.52	.086	2.26
	All Checking	5,935 6/8	93.5	15,734.4	2.8	3.1	37,852.19	.111	2.41
	Eradication	367 1/8	5.8	-	-	-	2,373.19	-	-
	Fire	43 5/8	0.7	-	-	-	270.42	-	-
	Total - - -	6,346 4/8	100.0	-	-	-	$40,495.80	-	-

TABLE 5

ANALYSIS OF ALL REGULAR CHECKING IN THE SUGAR PINE REGION - 1940

Operation	Number of Check											
	First				Rechecks				All Regular Checks			
	Man Days	Acres	Total Cost	Cost Per Acre	Man Days	Acres	Total Cost	Cost Per Acre	Man Days	Acres	Total Cost	Cost Per Acre
Oregon	157 1/8	9,132	$ 1,056.39	$.116	55 7/8	3,131	$ 375.67	$.120	213	12,263	$ 1,432.06	$.117
Plumas and Lassen National Forests	897 3/8	47,031	5,735.09	.122	318 7/8	14,659	2,036.03	.139	1,216 2/8	61,690	7,771.12	.126
Eldorado National Forest	634 2/8	33,034	4,043.38	.122	242 6/8	11,254	1,547.57	.137	877	44,288	5,590.95	.126
Stanislaus National Forest	429 7/8	23,408	2,605.29	.111	97 5/8	4,698	591.38	.126	527 4/8	28,106	3,196.67	.114
Sierra National Forest	126 3/8	8,632	810.80	.094	8 5/8	476	55.73	.117	135	9,108	866.53	.095
Lassen Volcanic National Park	12	778	96.79	.124	-	-	-	-	12	778	96.79	.124
Yosemite National Park	238 1/8	12,554	1,510.76	.120	49 1/8	2,580	311.21	.121	287 2/8	15,134	1,821.97	.120
Kings Canyon National Park	6	446	38.93	.087	-	-	-	-	6	446	38.93	.087
Sugar Pine Region	2,501 1/8	135,015	$15,897.43	$.118	772 7/8	36,798	$4,917.59	$.134	3,274	171,813	$20,815.02	$.121

PART IV

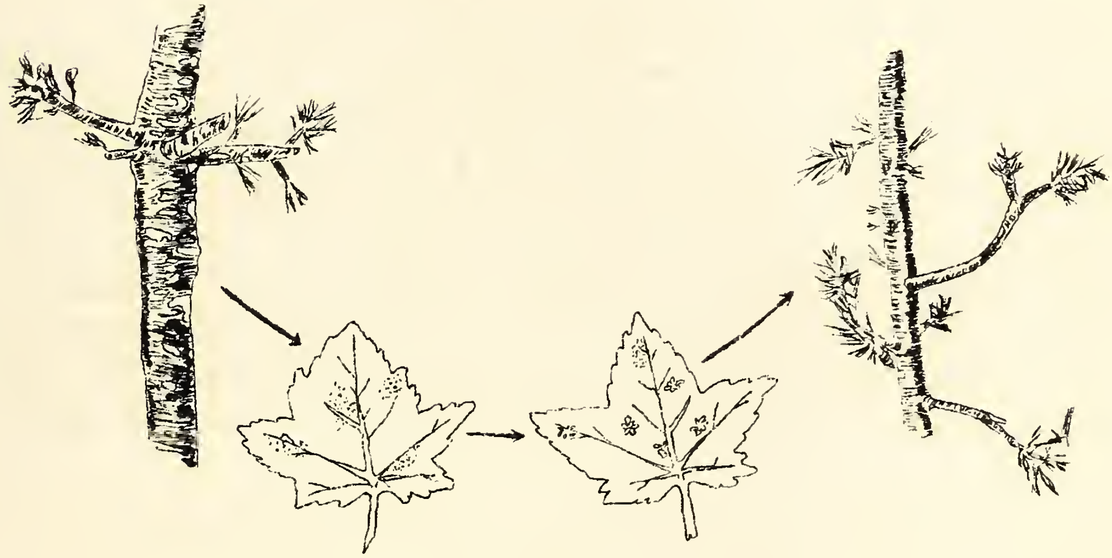
SCOUTING FOR WHITE PINE BLISTER RUST

By

Douglas R. Miller, Associate Forester

and

Harry G. Lachmund, Agent



The scouting season opened with the following preconditions: blister rust had been widely distributed to Ribes by aeciospores blown down from northern sources over the California sugar pine areas of the northern Coast Range and Sierra Nevada, respectively, to distances of 125 and 120 miles south of the Oregon border in 1937, with especially numerous infections through the Klamath region. In 1938 the spread to Ribes reached 160 miles south in the Sierra Nevada, with a decidedly lighter, but much less intensively scouted, distribution through the northern Coast Range than in 1937. In neither of these years was the Shasta National Forest, containing the northernmost sugar pine areas in the Sierra Nevada, intensively examined for rust infection. It represents a relatively poor scouting chance without the abundant pine-Ribes associations of the Lassen and Plumas National Forests and other forests southward of it. Nevertheless, infection had been found on this forest at a number of points and was undoubtedly well distributed over it in both years.

While the heaviest distribution of infection to Ribes in 1937 was in the Klamath region, the greatest amount in 1938 was found in the Sierra Nevada: in the Montgomery Creek region between the Lassen and Shasta National Forests, and around Viola to the northwest of Lassen National Park. Before 1937, infection had not been found beyond a few miles south of the Oregon border. No infection of Ribes whatsoever was found in California in 1939 either in the Coast Range or the Sierra Nevada, except in the near vicinity of sporulating cankers in the infection area on the East Fork of Indian Creek on the Klamath National Forest.

ORGANIZATION

In 1940 the scouting project was combined with pine and Ribes reconnaissance and with studies of rust damage (when conditions of infections should make the last necessary) and set up as a separate project under D. R. Miller as project leader. A small party composed of five ERA workers and a cook, which had been performing a reconnaissance of pine stands on the Trinity National Forest under the direction of the project leader, was transferred to scouting duties on the same forest in the first week of July. To the party was added W. B. Dunshee on part time from the staff of the Oakland office, and two temporary appointees: H. G. Lachmund, Agent, on July 12 and C. N. Partington, Agent, on August 17. Lachmund and Partington, being experienced blister rust scouts, although based at the scouting camp, were largely detailed to intensive examinations of certain favorable rust sites and to extensive examinations in the northern part of California in the attempt to establish the extent to which infections might have been distributed to Ribes by long distance spread of aeciospores from the north. When it later became evident that long distance spread to Ribes had not taken place, these two men concentrated on searching for pine infections in the western part of the Klamath Forest where they had notable success.

In addition to the organized crew described above, members of the Division of Forest Pathology as well as members of the blister rust personnel of all agencies on the various operations both in Oregon and California made observations from time to time along with their other duties.

LOCATION OF THE WORK

Organized scouting by the ERA party was started on the Trinity during the first week of July and from there was transferred to the Terry Mill-Montgomery Creek area in the extreme northwestern part of the Lassen National Forest. After thoroughly examining all Ribes concentrations in this area, the party worked southward to the vicinity of Viola and later worked as far south as the northern part of the Plumas National Forest. As all rust specimens collected had been identified as pinyon rust, the party in early September discontinued scouting and returned to its reconnaissance duties. In addition to rust samples collected by the party, specimens of rust on Ribes were sent in from the Yosemite National Park and the Stanislaus and Eldorado National Forests.*

* It was estimated that one out of every ten bushes examined in certain localities on the Eldorado National Forest were infected with *Cronartium occidentale*.

These were likewise all identified by the Washington office of the Division of Forest Pathology as pinyon rust.

Some scouting was done by the blister rust personnel of Oregon on the Klamath, Rogue River, and Umpqua National Forests, and blister rust on both pines and Ribes were found on each forest.

Lachmund examined the Montgomery Creek area, the district immediately south of Mt. Lassen, and the vicinity of Bailey Creek near Viola where two blister rust cankers were found on sugar pine. Later, Lachmund and Partington made extensive examinations on the Shasta and Klamath Forests.

METHODS OF WORK

The mechanics of scouting employed by the ERA workers on the project were practically the same in 1940 as those used in the past. The scout would examine the Ribes leaves to determine whether or not they were infected. In the early part of the season when all the leaves were green, the observations were made by examining the upper surface of the leaves and locating those with discolorations. These, in turn, were examined on the lower surface to see if the rust were present. However, as the season progressed and more and more leaves showed discolored spots, the stems of the bushes were cut and the under side of all leaves was given a thorough examination. Each branch was examined as it was cut off, and when any rust was found, the rust on the rest of the bush was left for further observation. Samples of the rust on Ribes leaves from each infected bush were collected for identification. Young five-needled pines were also examined when associated with Ribes, but when rust was found on Ribes, all the young pines in the vicinity were thoroughly examined for cankers and the larger ones were inspected from the ground for "flags."

Areas where pine infection was expected to be present, because of previously infected Ribes, were covered systematically by laying string lanes and by using regular Ribes eradication crew formation. Data pertaining to the inspection of both Ribes and pines were taken in the same manner as in the past.

Part of the reconnaissance party was transferred to scouting early in July; by the first of August, the entire crew was spending its full time looking for the rust. Since the rust had been located on Ribes at several points in northern California two or more years ago, the pines in these areas were thoroughly examined to see if any had become infected. As the season progressed and no blister rust was found on Ribes, it became more and more apparent that no long-distance spread had occurred. The ERA men were therefore returned to their reconnaissance duties while the appointed scouts were directed to concentrate their efforts in searching for the rust on pines.

WORK PERFORMED AND RESULTS OBTAINED

Scouting in and Adjacent to the Lassen National Forest

The Montgomery Creek area, where three incipient cankers on sugar pine had been found on April 19 by members of the Division of Forest Pathology (only one of the cankers was identified definitely as Cronartium ribicola), was intensively examined by both the ERA party and the detached scouts. Although no C. ribicola on either pines or Ribes was found except the single canker mentioned, numerous infections of pinyon rust were found.

In 1938 a heavy infection of Ribes by C. ribicola was found along Bailey Creek near Viola. Upon examination of the same area in 1940, Lachmund found two incipient cankers on sugar pine, which quite evidently resulted from the earlier Ribes infection. The entire territory around Viola was thoroughly scouted later by the ERA party for infection on Ribes, but none was revealed. Several especially favorable localities along Mill Creek and near Mineral, including those where rust had been found on Ribes in 1937, were likewise examined, but the results were negative.

J. L. Mielke, of the Division of Forest Pathology, made a study of wind charts for the first half of 1940 and found that there were no strong prevailing winds from the north during the period of aeciospore production. As a result of this study, it was predicted that 1940 would be a poor year for long-distance spread of the rust, even though a field inspection showed moisture conditions and Ribes leaf developemnt to be favorable for the infection of Ribes in many localities in the northern part of California. Also, the numbers of generations of rust shown by some of the pinyon rust infections indicated that these local conditions were favorable in many places. When wide-spread scouting on the Lassen failed to reveal infections of C. ribicola on Ribes, it thus became evident, when coupled with the other evidence, that aeciospores had not come south and been deposited on Ribes in this territory in 1940.

This evident failure of the aeciospores to be carried south created an exceptional opportunity, therefore, on the assumption of normal rust behavior, to determine the extent to which infection had been returned to pines by the infection spread to Ribes through these regions in 1937. If any considerable infection of pines had occurred in 1937, some of it normally should now be producing aeciospores and, in view of the favorable conditions for infection by these spores in the spring, have infected surrounding Ribes through which the location of the sporulating cankers could be traced. Accordingly, while continuing to check on the possibility of long distance spread of infection to Ribes, scouting was concentrated by Lachmund and Partington upon especially favorable associations of these hosts with young sugar or other white pines. No further infections, however, were found.

Scouting on the Shasta National Forest

Results being entirely negative in the Lassen country, so far as Ribes infections were concerned, the detached scouts then proceeded northward for a check of Ribes infection on the Shasta in territory closer to the

sources of aeciospores north of the Oregon border and for a search for pine infection both on the Shasta and on the Klamath, while the crew moved into the Mill Creek and Mineral areas for a systematic coverage of that entire region.

The first working of the area north of the Pitt River consisted of an inspection by Lachmund on July 22 of Ribes roezli, R. nevadense, and R. viscosissimum along the road from Big Bend to Red Mountain and thence westward along the ridge towards McCloud. It yielded two very light infections of Cronartium occidentale, one consisting of one leaf of R. roezli in Section 3, T. 37N., R. 1E., Mt. Diablo Meridian, and the other of two leaves on another bush of R. roezli in Section 7, T. 38N., R. 2E., M.D.M., but no C. ribicola.

On August 22 Lachmund and Partington set up a base near Dunsmuir from which scouting was concentrated upon excellent associations of Ribes and sugar or white pines in twenty localities in the surrounding territory. These localities were selected for excellent exposure to north winds as well as for abundance and favorable association of alternate hosts.

Especially good conditions were found along Sweetbrier Ridge, with frequent close associations of abundant R. cruentum and abundant young sugar pines, and along Big Springs Creek from the springs downstream one mile, with abundant R. klamathense closely associated with numerous, well distributed, thrifty young sugar pines up to 50 feet high along the stream course.

Scouting of the Shasta was concluded with an intensive inspection of the excellent associations of Shovel Creek from the Fireman's Station, Section 25, T. 47N., R. 3W., M.D.M., upstream $2\frac{1}{2}$ miles, including examination of 627 bushes of R. petiolare, 120 R. sanguineum, 42 R. lobbii, and a few R. lacustre, R. klamathense, and R. viscosissimum, and 97 sugar pines three to forty feet high and 102 western white pines two to fifty feet high.

Results of scouting on the Shasta National Forest were entirely negative.

Scouting on the Klamath National Forest

First scouting of a Klamath area consisted of a short inspection early in the season by W. V. Benedict of young sugar pines on upper Hungry Creek in the Beaver Creek basin in an area where infection of Ribes had been especially frequent in 1937, and resulted in the discovery of a young canker. Another incipient canker was found in the same vicinity by Benedict on August 2.

Lachmund made an inspection of the pine infection center on the East Fork of Indian Creek on July 25 and scouted for infection of Ribes between July 24 and August 1 at the following localities: East Fork of Indian Creek, Indian Creek below Indian Creek School, Elk Creek above Sulphur Springs, Road Indian Creek to Slater Butte, Tannin Lake Road beyond Slater Butte, Clear Creek, mouth of Thompson Creek, lower Grider Creek, Seiad Creek, Klamath River Highway near Hamburg, Beaver Creek, Hungry Creek

and Cottonwood Creek. In all this scouting the Ribes examined were in excellent association with sugar pines, but attention was concentrated upon the Ribes on the assumption that infection on the pines would have sporulated and could more readily be found through the resultant infection of the Ribes than by direct examination of the pines.

On Ribes the results were entirely negative except in the vicinity of sporulating cankers at the infection area on the East Fork of Indian Creek.

At the East Fork of Indian Creek aeciospore production had been greatly reduced from various causes as compared with 1939. In addition, a heavy rain during the period of aeciospore production had prevented much spore dispersal. What spores had reached the nearby Ribes had caused infection, however, and there had been good intensification of the rust on these plants, so that the amount of teliospore production, chiefly on Ribes bracteosum, was about a third of that in 1939 at the same time of the year. A wave of canker formation originating from Ribes infection in 1938 was in progress; this wave exceeded in volume all previous years' infection on pines combined.

Inspection of the four cankers found in 1939 in the area of infection of Ribes in 1937 on Grider Creek about a mile above its mouth showed that all these cankers had produced pycnia before the end of 1939, yet none had produced aecia in 1940. This fact, together with the curtailed aeciospore production at the East Fork of Indian Creek, suggested that a condition of inhibited production of aeciospores might be prevalent in the Klamath region and elsewhere in 1940, and further that some pine infection originating in 1937 or in earlier years might be found by concentrating upon inspection of pines in the proper situations where infection of Ribes had been so prevalent in 1937. A few incipient cankers of 1938 origin might also be found in this manner. However, no such occurrence of infection of pines was expected as was now to be found.

To follow out this idea, on September 11 Lachmund and Partington returned to the Klamath for an intensive inspection of suitably located pines of the proper young age classes and association with Ribes. The basins of Indian Creek, Elk Creek, and the Klamath River from Happy Camp to Orleans were used as a guide to conditions throughout the Klamath sugar pine range, for the bulk of which, excluding the drier cut-over lands of the Beaver Creek basin, their conditions may be considered representative.

The first infection was found on September 13 and consisted of two cankers on a young sugar pine near the mouth of the East Fork of Indian Creek. These cankers had produced pycnia in 1939 and 1940 but no aecia. Other infections, all of 1937 origin except, perhaps, for a few which may have occurred in 1938, were found in 14 of 31 localities selected for scouting as follows: in 6 of 14 localities in Indian Creek basin, in 4 of 8 in the Elk Creek basin, and in 4 of 9 in the Klamath River basin from Happy Camp to Orleans. These localities ranged in elevation from 800 to 4,900 feet. In all, the pine species was sugar pine.

In every locality cankers had produced pycnia in both 1939 and 1940, but not a single case of certain aeciospore production was recorded

out of a total of over nine hundred cankers found. In no case were closely associated Ribes found infected except for four leaves on a large *Ribes sanguineum* bush near two small sugar pines, each with a canker which had produced pycnia in 1939 but apparently no aecia in 1940, although an aecium or two may have been formed, have produced a few spores, and since have been eaten out by insects which had fed on the pycnial areas of these cankers to a certain extent.

In several localities the activities of various insects on the cankers had been extensive, in several the trees were hypersensitive and the cankers stunted and abortive with much early killing of branches and twigs, and at others the development was normal except for the universal failure to produce aecia. Explanation of this latter phenomenon must await further evidence in the future.

Infection locations arranged from north to south, their elevations, number of trees examined, number found infected, and number of cankers at each location are given in Table 1. At the fourteen localities, a total of 250 sugar pines out of 1,046 examined were infected, bearing 928 cankers.

In seventeen other localities in the same region 628 young sugar pines were carefully examined but found free of infection. This brought the total number of trees examined to 1,674, and the number of localities to 31.

Scouting on the Trinity National Forest

Lachmund and Partington concluded their scouting with a two day trip through the Trinity National Forest on September 29 and 30, extending their scouting southward from the Klamath River up the Trinity River and finishing with an inspection of the headwaters of Hayfork Creek where good pine-Ribes association had been reported and where infection of Ribes had been found at a number of points in 1937.

In the basin of the Trinity River scouting was done about seven miles up Willow Creek where *Ribes bracteosum* and some *R. cruentum* were poorly associated with young pines that were too large for close inspection. Other areas examined include the first part of the road to Denny along the northeast side of the Trinity River where there is an excellent association of abundant *R. cruentum* and abundant young sugar pines having an excellent exposure; another excellent though smaller association of these species well exposed three quarters of a mile farther south along the Trinity River Highway on the southwest side of the river; the Snow Basin trail above Dan Gaff's Place southwest of Burnt Ranch, where scouting conditions were mediocre; and Price Creek across from Big Bar for half a mile upstream, where all conditions were outstandingly good with abundant *R. cruentum* closely associated with numerous young sugar pines in several places. The last area together with those on the road to Denny and nearby along the Trinity River Road gave a good measure of the degree to which the infection of pines in 1937 extended southward. Had these areas been situated farther north on the Klamath, some infection would have been found in at least one and probably in all three of them. As it was no infection was found in any.

The associations on the headwaters of Hayfork Creek were excellent in a few places but generally disappointing, considering the quantities of Ribes and sugar pines present, because of insufficiently susceptible Ribes species or insufficiently close association or poor exposure. Inspections were made in Section 35, T. 29N., R. 11W., Section 11, T. 28N., R. 11W., and along the road Brushy Ridge to Harrison Gulch mainly in T. 29N., R. 11W., all Mt. Diablo Meridian. The basis in number of pines and Ribes examined was sufficient here to indicate that little if any infection was returned to pines in 1937. The ERA party likewise was unsuccessful in finding infection on the Trinity National Forest.

SUMMARY

Tables 1 to 4 give the results of scouting in California during 1940 in terms of infections of *Cronartium ribicola* and *C. occidentale* and of the number of hosts examined.

Intensive scouting for the rust on Ribes in July in the Montgomery Creek region and in the northern Lassen National Forest and the Klamath National Forest quickly demonstrated that aeciospores from northern sources, which had spread infection to Ribes widely in northern California in 1937 and 1938 must have failed to be carried south in 1940, for though spring conditions for infection of Ribes by these spores had been favorable over these regions, no infection could be found.

Scouting was then concentrated upon finding pine infection that might have resulted from the wide spread of the rust to Ribes in 1937. It failed to discover any such infection in the northern Lassen or the Shasta National Forest, although a few incipient cankers were found in the area near Montgomery Creek and near Viola where infection had been heavy on Ribes in 1938. On the Klamath, however, a heavy return of infection to pines was found to have occurred from the infection of Ribes in 1937. Scouting was centered in the basins of Indian Creek and Elk Creek and down the Klamath River from Happy Camp to Orleans. Infection was found over a range of elevation from 800 feet to 4,900 feet and from a point near the Oregon border south for fifty miles in 14 of 31 favorable localities selected for scouting. In these localities 250 out of about 1,000 young sugar pines examined, or one quarter, were infected and had a total of 928 cankers. A total of 1,672 young sugar pines ranging mainly below fifteen feet were examined in all 31 areas.

Cankers ranged from a few to several hundred in each area. Although the majority had produced pycnia in 1939 and many of these were close enough together to assure the opportunity of fertilization by admixture of the pycnial fluids so that some should normally have produced aecia, no certain instance of aecial production was seen in any case, and closely associated susceptible Ribes were uninfected except for one light infection on *Ribes sanguineum*. In many cases the trees were hypersensitive, canker development was abortive, and twigs and branches were already being killed by some of the cankers. In others, insects were feeding on the pycnia. In still other cases, canker development was normal and the total failure of the cankers to produce aecia must await further observations for a complete explanation.

Ribes cruentum was the responsible agent for infection of the pines in the majority of cases, but R. sanguineum became the most important agent at the higher elevations, where it is the most abundant species.

A brief but fair sampling of the region to the south on the Trinity National Forest indicated that relatively little infection of pines is likely to have occurred on this forest as yet.

Of prime importance were the generally negative results with regard to pine infection in 1937 through the northern Sierra Nevada, and the meagre infection of sugar pine resulting from the heavy infectien of Ribes there in 1938, especially at the Old Terry Mill and Bailey Creek infection areas. In both 1937 and 1938 weather conditions were supposedly favorable for the infection of pines in these regions and the full significance of this negative reaction must await further observations.

The heavy and widespread return of infection to pines on the Klamath support the previous indications from the East Fork of Indian Creek and from the wide distribution of infection of Ribes on this forest in 1937 that conditions in this region are highly favorable to blister rust. It may be concluded that results obtained in the area scouted in 1940 are representative of the entire forest, except possibly the cut-over lands of the Beaver Creek basin on the drier eastern side, and that pine infection is now generally distributed on this forest.

The failure of the cankers to produce aecia and the hypersensitiveness of some of the sugar pine biotypes on the Klamath add valuable data upon the behavior of the rust on this species.

The thoroughly negative results in scouting for infection on Ribes despite favorable spring conditions for infection by aeciospores gave decisive evidence that in 1940 aeciospores failed to be carried south from northern sources and to be deposited on Ribes over northern California, where they had caused extensive infection in 1937 and 1938.

However, the known infection on sugar pine, resulting from Ribes infection points of 1937 and 1938, has been extended southward 42 miles from the Oregon line on the Klamath National Forest and 107 miles on the Lassen National Forest.

TABLE 1

LIST OF BLISTER RUST INFECTIONS ON SUGAR PINE FOUND IN CALIFORNIA IN 1940

Localities	Section	Township	Range	Elevation	Number of Sugar Pines Examined	Number of Sugar Pines Infected	Number of Cankers
KLAMATH NATIONAL FOREST							
1. Poker Flat*	29	18 N	6 E	4,900'	50	5	6
2. Indian Creek Road	15	18 N	6 E	3,450'	165	105	550
3. South Fork Indian Creek Road	8	17 N	7 E	1,700'	52	6	7
4. South Fork Indian Creek Road	7	17 N	7 E	1,800'	120	50	200
5. East Fork Indian Creek Mouth	9	17 N	7 E	1,500'	163	1	2
6. Indian Creek Road	15	17 N	7 E	1,300'	30	2	2
7. Elk Creek (Malones Ranch)	12 & 13	15 N	7 E	1,800'	250	35	64
8. Elk Creek (above Sulphurs Springs)	32	15 N	8 E	2,300'	15	3	3
9. Elk Creek Trail near Granite Creek	9	14 N	8 E	2,950'	19	1	5
10. Burney Creek	21	14 N	8 E	4,200'	9	4	4
11. Cottage Grove	15	14 N	6 E	900'	8	3	14
12. Tea Creek	8	13 N	6 E	800'	100	25	60
13. Eyesbar Creek	20	13 N	6 E	800'	20	4	4
14. Ridge above Teneyck Creek	30	12 N	6 E	3,600'	45	6	7
Total - 14 localities	-	-	-	-	1,046	250	928
LASSEN NATIONAL FOREST							
1. Terry Mill - Montgomery Creek**	15	34 N	1 E	4,300'	206	1	1
2. Bailey Creek near Viola	30	31 N	3 E	4,400'	913	2	2
Total - two localities	-	-	-	-	1,119	3	3

* Four leaves on a Ribes sanguineum adjacent to two diseased pines were infected with blister rust. This was the only blister rust found on Ribes in California in 1940 except for those at the old infection center in the East Fork of Indian Creek.

** Infection at this location found by J. L. Mielke of the Division of Forest Pathology.

TABLE 2

NUMBER OF RIBES BUSHES, BY SPECIES, EXAMINED ON SCOUTING DURING 1940

Host Species	NATIONAL FORESTS							
	Klamath	Lassen	Mendocino	Plumas	Shasta	Trinity	Eldorado	Total
Ribes bracteosum	433	-	-	-	-	10	-	443
Ribes cereum	-	141	-	-	-	-	-	141
Ribes cruentum	2,757	-	50	-	2,596	479	-	5,882
Ribes inerme	-	3,288	-	130	5	-	620	4,043
Ribes klamathense	150	-	-	-	739	-	-	889
Ribes lacustre	8	-	-	-	130	69	-	207
Ribes lobbii	92	-	200	-	42	30	-	364
Ribes nevadense	-	1,848	-	310	1,805	50	1,040	5,053
Ribes petiolare	-	-	-	-	627	-	-	627
Ribes roezli	-	32,918	-	1,321	2,620	-	6,390	43,249
Ribes sanguineum	487	-	-	-	120	-	-	607
Ribes viscosissimum	-	266	2	-	360	-	146	774
Total - - -	3,927	38,461	252	1,761	9,044	638	8,196	62,279

TABLE 3

NUMBER OF WHITE PINES EXAMINED AND NUMBER FOUND TO BE INFECTED IN 1940

National Forest	Pinus lambertiana		Pinus monticola		Total	
	Examined	Infected	Examined	Infected	Examined	Infected
Klamath National Forest	1,720	250			1,720	250
Lassen National Forest	1,852	3			1,852	3
Mendocino National Forest	40	-			40	-
Shasta National Forest	1,677	-	239		1,916	-
Trinity National Forest	343	-	-		343	-
Total - - -	5,632	253	239		5,871	253

TABLE 4

NUMBER OF RIBES BUSHES LOCATED THAT WERE INFECTED WITH PINYON RUST - 1940

Host Species	Klamath National Forest	Lassen National Forest	Shasta National Forest	Eldorado National Forest	Total
Ribes sanguineum	1	-	-	-	1
Ribes roezli	-	26	2	125	153
Ribes nevadense	-	2	-	4	6
Ribes inerme	-	2	-	30	32
Total - -	1	30	2	159	192

PART V

BLISTER RUST CONTROL RECONNAISSANCE IN CALIFORNIA

1940

By

Douglas R. Miller, Associate Forester

INTRODUCTION

An examination of the available information pertaining to the blister rust control units revealed that the data on some units or portions of units were insufficient for the proper planning of a Ribes eradication program. Little knowledge is available on the amount of sugar pine, Ribes distribution, and working conditions on some of the forests, as neither reconnaissance nor Ribes eradication has yet been done within their boundaries. More complete information on those forests is needed to determine whether or not control units as now outlined are justified, and if so, how much and which areas should be included. On those forests where Ribes eradication is being done, a pine count on marginal areas is, in most cases, the only additional information needed.

As a result of the examination of available data, it was thought best to begin collecting additional information as soon as possible. A reconnaissance party started work on the Trinity National Forest during the first week of May. Crews taking only pine count were used on the Plumas, Eldorado, and Stanislaus National Forests, because that was the only data lacking on those control units.

These data, in addition to their value in delimiting control boundaries, will play an important part in determining the priority of undertaking control work upon the area with respect to other areas.

LOCATION AND DESCRIPTION OF AREAS

The Trinity National Forest was selected to receive immediate work since little information regarding it was available, and because the rust is beginning to invade its borders. This forest lies in the northwestern part of the state in the Coast Range Mountains. The Pacific Ocean lies from 15 to 40 miles west of the western forest boundary, and the Oregon line about 60 miles to the north. The forest is drained by the many branches of the Trinity River, but a narrow strip in the southwest is drained by the Mad and Van Duzen Rivers.

The forest as a whole is rough and contains many high peaks, high ridges, and deep river canyons. Most of the ridges and peaks support a fair stand of timber while the canyon walls are usually covered with brush. Sugar pine is found over most of the forest, although its commercial range is limited. In areas where sugar pine is numerous enough to be classed as type, it grows in association with Douglas fir, ponderosa pine, red fir, incense cedar, and various species of hardwoods.

The area covered by reconnaissance lies between the South Fork and the Hay Fork of the Trinity River. It has an elevation of from 4,000 to 5,000 feet and is not quite so rugged as the rest of the forest. Most of this unit was surveyed from the Humboldt Meridian although the eastern portion fell in the Mt. Diablo Meridian. As Indian Valley Creek is the largest drainage in the district, the unit is generally known as the Indian Valley unit. Sugar pine is found throughout the area and in most places in such quantities as to warrant protection. The timber, as a whole, is poorer in quality than that found in the Sierra Nevada,but, when evaluating the stand for the purpose of control work, inferior quality is more than offset by the scarcity of Ribes. Although there are many species of Ribes found on the forest, only Ribes cruentum, R. nevadense, R. lobbii, R. lacustre, R. sanguineum, and R. viscosissimum were found on the area covered. Most of the Ribes population was confined to streams and draws or to the tops of high ridges. The Indian Valley area has one of the best road systems to be found on the forest and most of the area is readily accessible from the roads. Weaverville, the headquarters of the Trinity National Forest which is situated at the eastern boundary, was the temporary headquarters of and the base of supplies for the reconnaissance camp.

During the first week of July, the party moved to Montgomery Creek on the Lassen National Forest and continued reconnaissance work in conjunction with scouting. Other work was done at Viola and in the vicinity of Stirling City on the same forest. These areas are similar to others on the forest which have been described in former reports; therefore, no detailed description will be given here.

Pine counts on the Plumas, Eldorado, and Stanislaus National Forests were taken on the borders of or between existing control units, all of which have been described in previous annual reports.

METHODS OF WORK

The methods used in the regular reconnaissance work were similar to those used in the past. Compass and pacing were used to determine direction and distance for the four strips which were run per section. Ribes data were taken on a continuous strip but recorded by five-chain transects, and timber data were taken on one-tenth acre circular plots at ten-chain intervals along the course of the strip. A type map and a brush density map were also made.

String lines were laid along opposite section lines for each section and were used for control purposes. By doing this ERA men could cover two miles of strip per six-hour day. Many of the control lines were relocated by use of staff compass and chain, the rest by pacing and box compass.

Emphasis was placed on obtaining an accurate sugar pine count. In taking the pine data the man would pace out and mark the boundary of the circular plot in four places. This plot was again divided by marking off an inner circle and then the trees were counted first on the outer circle and then on the inner circle. The trees were recorded by the following four size classes, 0 - 1", 1.1" - 6", 6.1" - 12", and 12" plus. All diameters were measured at ground level except the 12-inch diameter which was taken at breast height.

For a more detailed description of the mechanical procedure of taking reconnaissance data, see page 173 of the 1934 Annual Report. The only major deviation in method was that sugar pine for each size class was counted over the entire timber plot; it had been the practice previously in thickets of coniferous reporduction to count the smallest diameter class on one quarter of the circular plot and then to multiply the score by four, a practice adopted obviously to save time.

Sugar pine counts conducted on the various forests were taken on from 4 to 16 strips per section, and most of them were made on continuous strips. The size classes used were, for all practical purposes, the same as those used by the reconnaissance camp. In most cases only general information on Ribes and brush was taken in addition to the sugar pine count.

WORK PERFORMED AND RESULTS OBTAINED

After the various data were collected and analyzed, it was thought best to make a type map based on pine count. The number of trees per acre necessary to constitute type was taken from an analysis of all former reconnaissance data. These figures: 38 trees, 0 to 1 inch in diameter, 11.7 trees, 1.1 to 6 inches in diameter, 2.1 trees, 6.1 to 12 inches in diameter, and one tree over 12 inches, were taken from the reconnaissance analysis. From this study it was found that 53 sugar pine trees per acre of all size classes, would produce enough volume to warrant protection under average working conditions. In typing, a weight of 25 percent was given to each size class and any combination of trees that gave 100 percent or more was considered as being type. For further information areas were broken down into sugar pine mature, nonsugar pine mature, sugar pine cutover, and nonsugar pine cutover, and the

data were compiled and summarized by these types. The types were transferred to two-inch per mile township plats, which were then bound in the permanent record book for all reconnaissance data.

Table 1 gives the sections and acreages that were covered by the reconnaissance party on both the Trinity and Lassen National Forests.

Table 2 is a summary of the data taken by the reconnaissance party, and is broken down by the four types. There were 43,710 acres covered on the Trinity National Forest, which supported an average of 102 sugar pines and 17 Ribes per acre. On the Lassen National Forest 56,548 acres in four separate units were covered, which shows 96 sugar pines and 43 Ribes per acre. The average per acre of both forests for sugar pine type alone is better than 140 trees.

Table 3 is a summary of the data taken by the pine count crews on the Plumas, Eldorado, and Stanislaus National Forests. For the 89,740 acres sampled on the three forests there was an average pine count of 85 trees per acre. No Ribes data were collected on these areas. The average for sugar pine type alone ranged from about 120 trees per acre on cut-over areas to about 140 trees per acre for mature stands.

TABLE 1

SUMMARY AND LOCATION OF AREAS COVERED BY RECONNAISSANCE - 1940

Township	Range	Sections by Number	Totals: Sections	Totals: Acres
TRINITY NATIONAL FOREST				
Humboldt Meridian				
1 S	7E	1, 2	2	1,280
	8E	6	1	640
1 N	7E	22-26, 35-36	7	4,000
	8E	4-9, 16-21, 28-33	18	11,390
2 N	7E	10-15, 23-24	8	5,120
	8E	17-21, 28-33	11	6,560
Mt. Diablo Meridian				
30 N	12W	7-8, 15-23, 26-30	16	10,240
31 N	12W	17-20, 29-31	7	4,480
		Total	70	43,710
LASSEN NATIONAL FOREST				
Mt. Diablo Meridian				
23 N	4E	1-2, 11-14, 21-24, 26-29	14	8,640
	5E	3-9, 17-19	10	6,160
24 N	3E	13, 24	2	800
	4E	8, 17-20	5	2,080
	5E	8-9, 14-18, 20-23, 27-29, 31-34	18	11,120
31 N	2E	1-2, 12-13, 24-25, 36	7	3,728
33 N	2E	16-21, 27-28	8	4,160
34 N	1E	8-17, 23-24	12	7,680
	2E	3-6, 8-11, 14-16, 23	12	7,680
35 N	2E	27-34	8	4,500
		Total	96	56,548
		Grand Totals	166	100,258

TABLE 2

SUMMARY OF RECONNAISSANCE DATA - 1940

National Forest	Unit	Type	Acres	Per Acre Ribes	Per Acre Sugar Pine
Trinity National Forest	Indian Valley	Sugar Pine	28,702	17.4	147.8
		Non-SP	14,865	16.7	15.4
		SP-Cutover	111	-	171.7
		Non SP-Co.	32	-	-
		Total -	43,710	17.0	102.0
Lassen National Forest	Montgomery Creek	Sugar Pine	10,353	39.8	159.4
		Non-SP	5,344	78.3	7.5
		SP-Cutover	3,823	54.0	125.1
		Non SP-Co.	4,500	150.0	7.9
		Total -	24,020	70.9	91.8
	Rag Dump	Sugar Pine	8,362	4.3	138.6
		Non-SP	3,749	10.1	12.3
		SP-Cutover	10,484	31.6	154.0
		Non SP-Co.	3,325	27.2	13.2
		Total -	25,920	19.2	112.8
	Viola	Sugar Pine	1,871	8.9	102.0
		Non-SP	1,857	65.2	7.4
		Total -	3,728	37.2	54.7
	Powelton	SP-Cutover	1,337	15.5	63.1
		Non SP-Co.	1,543	43.1	3.1
		Total -	2,880	30.9	29.7
	Sub-total	Sugar Pine	20,586	22.5	145.6
		Non-SP	10,950	52.6	9.3
		SP-Cutover	15,644	35.8	139.9
		Non SP-Co.	9,368	91.0	8.8
		Total -	56,548	43.0	95.8
Total All Forests and Units		Sugar Pine	49,288	19.5	146.9
		Non-SP	25,815	32.0	12.7
		SP-Cutover	15,755	35.6	140.1
		Non SP-Co.	9,400	90.6	8.8
		Total -	100,258	31.7	98.5

TABLE 3

SUMMARY OF PINE COUNT DATA, 1940

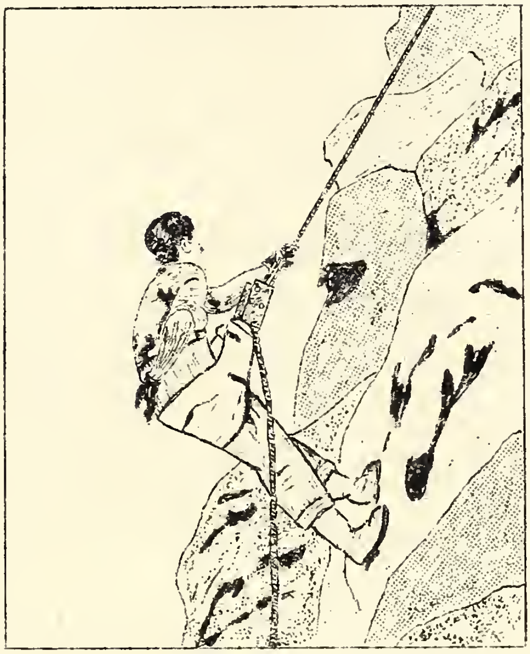
Forest	Type	Total Acres	Average Pines Per Acre
Plumas National Forest	Sugar Pine	13,575	136.41
	Non-Sugar Pine	8,642	11.83
	Sugar Pine - Cutover	7,402	118.95
	Non-Sugar Pine -Cutover	5,771	15.40
	Total - - - -	35,390	82.19
Eldorado National Forest	Sugar Pine	16,268	141.33
	Non-Sugar Pine	13,697	19.46
	Sugar Pine - Cutover	6,338	120.90
	Non-Sugar Pine -Cutover	5,627	19.68
	Total - - - -	41,930	85.02
Stanislaus National Forest	Sugar Pine	1,951	271.96
	Non-Sugar Pine	1,530	26.90
	Sugar Pine - Cutover	5,211	122.41
	Non-Sugar Pine -Cutover	3,728	15.82
	Total - - - -	12,420	93.48
Total All National Forests	Sugar Pine	31,794	146.10
	Non-Sugar Pine	23,869	17.81
	Sugar Pine - Cutover	18,951	120.83
	Non-Sugar Pine -Cutover	15,126	17.56
	Total - - - -	89,740	85.46

PART VI- Section 1

METHODS DEVELOPMENT WORK IN THE SUGAR PINE REGION DURING 1940

By

L. P. Winslow, Agent



INTRODUCTION

During the 1940 field season, all of the Bureau blister rust camps in the Sugar Pine Region of California were located in areas which contained relatively few Ribes. With the exception of the Siskiyou and Klamath jobs in southern Oregon, the areas representing troublesome eradication problems were responsibilities of the Forest Service and the National Park Service. Of necessity, developmental work in such areas had to be confined to the demonstration and use of practicable eradication methods. Oil was used extensively to treat rockbound bushes on Lassen National Park. Dynamite was employed on Yosemite National Park in some of the troublesome patches of R. nevadense. Power methods were used at the Soquel CCC Camp, Sierra National Forest, for direct removal of Ribes by the D-2 tractor and for constructing manways through brush fields to facilitate the subsequent movement of regular eradication crews. Effective use was made of dry chemical in southern Oregon.

In order to take advantage of the special conditions under which the Bureau camps would be working, it was agreed (in conference with the operations men) that a study should be made of the relative merits of advance stringing and regular stringing in relation to efficiency of eradication crews. During the first six weeks of the field season, this cooperative study was set up by L. P. Winslow with the help of Roy Blomstrom on the Stanislaus and Eldorado, and Benton Howard on the Plumas National Forests. Also in accordance with the general plan of conducting the 1940 methods work on a broad-gauge cooperative basis, L. P. Winslow spent the last month of the field season assisting in a preeradication survey of the South Umpqua in southern Oregon.

This report summarizes: (1) Results of 1939 field work. (2) Further comments on work done prior to 1939. (3) Methods work undertaken during 1940. (4) Laboratory and greenhouse work November 1939 to May 1940. (5) Status of recommendations on special methods of Ribes eradication and new developments of 1940. The developments along mechanical lines are jointly reported by J. F. Breakey and L. P. Winslow in Part VI, Section 2, of this report. Ribes ecology studies, pollination tests on Ribes, and the establishment of grazing exclosures are described in Part VI, Section 3, by C. R. Quick.

RESULTS OF 1939 WORK

The Use of Dynamite in Ribes Eradication

Examination of the Ribes bushes eradicated by means of dynamite in operations work and methods tests showed only a small number of sprouts. On the *Ribes cereum* paired-bush plot near old Camp 5, Sierra National Forest, all bushes dug by hand were dead, and all but one of the blasted bushes were dead. The sprouting of this one bush was due to a poor clean-up job which left a small portion of the crown buried; three small sprouts resulted.

The small amount of ditching done on the Plumas National Forest resulted in satisfactory drainage of a swampy area.

The blasting of large *R. cereum* in General Grant National Park proved satisfactory. Although no clean-up was attempted after the blasting, only a moderate amount of sprouting resulted.

The Application of Salt-Borax Mixture to Decapitated Ribes

The results of the 1939 decapitation tests on rockbound Ribes bushes of various species were recorded on June 6, 1940 and again on August 1. These Ribes crowns had been treated with a 1:1 mixture of common salt (NaCl) and borax (sodium tetraborate - $Na_2B_4O_7.10\ H_2O$). Of the 112 bushes treated, only two *R. roezli* survived. The tests thus resulted in a kill of 98.83 percent. Table 1 gives plot data by species and average dosage per bush for this work.

The salt-borax mixture is cheap, nonhazardous and effective and has been recommended for use as a dry chemical in all phases of operations work where it is not practicable to use oil. A special memorandum on the

use of salt-borax was prepared by H. R. Offord and sent to all regional offices.

TABLE 1

RESULTS OF DECAPITATION TESTS ON ROCKBOUND RIBES, TUNNEL CREEK, SIERRA NATIONAL FOREST, CALIFORNIA, OCTOBER 4, 1939

Ribes Species	Total Number Bushes Treated	Number Surviving Bushes	Total Chemical Used (Ounces) 1/	Percent Kill
R. roezli	57	2 2/	542.0	96.49
R. cereum	11	0	155.3	100.00
R. nevadense	9	0	184.1	100.00
R. viscosissimum	35	0	341.7	100.00
Totals - - - -	112	2	1,223.1	98.83

1/ Common salt + powdered borax (1:1). Dosages varied from 3-1/2 ounces to 55 ounces, depending on the size of the crown or composite crown.

2/ A portion of the crown of one bush had not been treated; the crown of the other surviving bush was back under a rock shelf where it could not be reached with dry chemical.

Results of Toxicity Tests of New Oil Sprays

Field tests were made in August 1939 to determine the toxicity of Diesel oil, furfural, furfural saturated with ammonium thiocyanate, and these materials in various combinations with one another.

On the basis of data shown in Table 2, it may be concluded that in the case of R. roezli, (1) the highest kill was obtained with the mixture of Diesel oil and furfural, (2) the furfural alone or the furfural in mixture with ammonium thiocyanate in the proportions used in the combined oil formula does not in itself account for any part of the killing action, (3) the combination of Diesel oil and furfural saturated with ammonium thiocyanate was less effective than the straight Diesel oil. The experiment was designed to give about 50 percent kill so that any differences in toxicity would be exhibited to a maximum degree. The funds available for this test were not adequate to conduct it on a scope which would have given significant results. As a matter of record, the results of these tests are given in Table 2.

TABLE 2

TOXICITY TESTS OF DIESEL OIL, FURFURAL, AND FURFURAL SATURATED WITH AMMONIUM THIOCYANATE, SIERRA NATIONAL FOREST, CALIFORNIA TESTS MADE IN AUGUST, 1939

Plot No.	Number of Bushes Treated	Area of Plot (Sq. Rods)	Dosage in Gallons Per Square Rod				Live Bushes 1940	Percent Bushes Killed
			Diesel Oil	Furfural	Furfural Saturated with Ammonium thio-cyanate	Water		
1	60	1/2		1 1/2		13 1/2	60	0.0
2	68	1	13 1/2		1 1/2		29	57.3
3	57	1/2			1 1/2	13 1/2	57	0.0
4	60	1	13 1/2	1 1/2			16	73.3
5	68	1	15				21	69.1
6	83	1	15				23	72.2
7	90	1	13 1/2		1 1/2		40	55.5
8	71	1	13 1/2	1 1/2			32	54.9
9	70	1			1 1/2	13 1/2	70	0.0
10	70	1/2		1 1/2		13 1/2	70	0.0

Check of 1939 Tests of Eradication of Upland Ribes by Power Methods

On June 5, 1940, a check was made of the Bretz Mill area, Sierra National Forest, California, where power methods of upland Ribes eradication had been carried out experimentally in the fall of 1939. The spots of heaviest Ribes concentration were selected for examination and regular 1/4-chain wide check strips were run at intervals across these chosen areas. Seventy-seven chains of check strip were run on 37 1/2 acres, making a 5.12 percent check. Table 3 shows data recorded by time of work and type of equipment used. A four to five-inch snowfall and rain the first part of October resulted in increased soil moisture for October work. Seedlings were practically absent except in one small portion of the area which lay along the edge of a moist grassy meadow.

TABLE 3

RESULTS OF 1939 TESTS OF ERADICATION OF UPLAND RIBES BY POWER METHODS
SHAVER LAKE AREA, SIERRA NATIONAL FOREST, CALIFORNIA
SEPTEMBER 15 - OCTOBER 15, 1939

Month of Work	Front End Rake					Rear Drum Hooks				
	Acres Worked	Heeled in and Alive Per Acre	Crown Sprouts Per Acre	CSS* Per Acre	All Live Bushes	Acres Worked	Heeled in and Alive Per Acre	Crown Sprouts Per Acre	CSS* Per Acre	All Live Bushes
September	8.28	6.28	4.34	0.0	10.62	4.87	1.05	2.89	0.0	3.94
October	5.36	2.05	3.55	16.8	5.60	18.99	2.84	3.68	10.53	6.52
Totals	13.64	5.35	4.03	6.6	9.38	23.86	2.48	3.52	8.40	6.00

*CSS = Current season seedlings.

For the front end rake, the difference between 10.62 live bushes per acre for September work, and 5.6 live bushes per acre for October work, can be attributed to the inexperience of the operator during preliminary trials. The increased number of live bushes per acre for October work with grapple hooks is probably a result of the high soil moisture. The power eradication work done at Soquel with CCC labor after October 15 showed considerably more surviving bushes than the work done at Shaver Lake. The lower efficiency on the Soquel job can be charged partly to inexperienced CCC labor and to the soil moisture which was more favorable to regeneration, and partly to the heavier clay soil which prevented clear-cut removal of roots.

Check of Decapitation and Chemical Treatment of Rockbound Ribes at Lassen Volcanic National Park, California

Some twenty-five acres of the Lost Creek area, Lassen Volcanic National Park, California, were checked in July. The area lies on the northeast slope of a steep boulder-strewn moraine. From 10 to 15 percent of the Ribes crowns were rockbound and had been decapitated and treated with oil or dry chemical during the latter part of the 1939 season. On the area examined, a total of 816 bushes (sprouting or missed) were found. Oil and dry chemical had been used too sparingly, especially for the late-season work, with the result that the amount of sprouting exceeded the normal expectancy. The economical application of oil and chemical sometimes made it difficult to determine which crowns had been treated the previous year. Since much of the area had borne over 1,000 Ribes per acre originally, actual reduction of live stem at first working was satisfactory.

FURTHER COMMENTS ON WORK DONE PRIOR TO 1939

Broadcast Oil Tests in Oregon

During the latter part of May, the *Ribes binominatum* plots on Roundtop Mountain, Rogue River National Forest, Oregon, were examined. These plots, established in August 1938, were thoroughly checked in 1939 (p. 101, 1939 annual report) and since no apparent change had occurred since the last check, a detailed check was not deemed necessary. The areas sprayed with heaviest dosages of Diesel oil + SO_2 extract, and other oil mixtures, showed little change from the 1939 condition, but the remaining plots will be back to near normal conditions in a few more years.

Decapitation Tests in Oregon

Examination of decapitated *R. bracteosum* crowns which had been treated with saturated solutions of ammonium or sodium thiocyanate (work done in 1938) showed the same results as the 1939 check. Bushes in dry or moist soil were dead, while surviving bushes in very moist, or muddy, boggy soils were growing vigorously.

Decapitation Tests in California

The 1938 decapitation plots were examined during the early part of June. With the exception of data for the *R. cereum* plot near Beasore Meadow, Sierra National Forest, California, no changes need be made in the records of the 1939 check of these plots.

In the case of the *R. cereum* plot (decapitated bushes treated with Diesel oil and light crude oil mixed in the ratio of 1:1) four crowns which sprouted in 1939 did not sprout in 1940 and apparently were dead. One crown reported dead in 1939 produced one weak sprout in 1940. These changes resulted in a final kill of 68.75 percent in 1940, an increase in bush kill of 21.75 percent over that reported in 1939. Apparently the toxic property of the oil did not exert its full effect the first year after treatment. The plot will be checked again in 1941 and any further change reported.

Treatment of Large Intact R. roezli by Means of Oil

Intact bush plots were re-examined in 1940. No additional kill or survival was noted (see pp. 109-111 of 1939 report).

Results of 1938 Large-Scale Methods Tests on the Eradication of R. roezli Seedlings by Oil

The 1939 detailed check was considered sufficient. When the area is post-checked by the regular checking organization a year or two hence, a further report on this area will be compiled.

Results of Dosage Tests of Diesel Oil on Small R. roezli Plants and the Effect of Oil on the Viability of Ribes Seeds

The six milacre plots sprayed with oil in the fall of 1937 at Boggy Meadow, Sierra National Forest, were rechecked on June 13. Trampling by cattle was not as severe as in previous years. All fruiting bushes were moved.

The 29 milacre plots on Chowchilla Mountain which had been sprayed with oil in August 1938 were rechecked the middle of June. The current year proved to be a poor seedling year. Controls on the fenced area showed 55 percent fewer seedlings than in 1939. Unfenced milacre ecology plots in the vicinity showed approximately one-third the number of seedlings this year in comparison with 1939.

Tables 4 and 5 show, respectively, the regeneration of R. roezli seedlings on the plots at Boggy Meadow and Chowchilla Mountain. Figure 1 shows the effectiveness of the various oil treatments on Chowchilla Mountain after the lapse of two years. Figure 1A, p. 106 of the 1939 annual report, illustrates the same factors one year after treatment.

Selective Treatment of R. roezli with Oil

Small portions of the selectively treated oil plots were examined and no additional kill or survival could be found. The plot study is considered complete as given on pages 104 and 107-108 of the 1939 report.

TABLE 4

RESULTS OF DOSAGE TESTS OF DIESEL OIL ON SMALL R. ROEZLI PLANTS AND THE EFFECT OF OIL ON THE VIABILITY OF SEEDS, PLOTS AT BOGGY MEADOWS, SIERRA NATIONAL FOREST, CALIFORNIA TREATED IN 1937

Plot No.	1937 Dosage (Gallons Per Milacre)	June 13, 1940				June 30, 1939				August 10, 1938	
		1940 Seedlings	1939 Seedlings	Other Vegetation	Trampling	1939 Seedlings	1938 Seedlings	Other Vegetation	Trampling	1938 CSS	Trampling
1	0.5	193	-	Herbaceous	Slight	62		Vegetation growing well	Moderate	Present	
2	1.0	159	-	do.	do.	107		Grass, etc.	do.	do.	
3	1.5	32	2	do.	Moderate	21		Grass, Herbs	Severe	do.	Extremely severe
4	2.0	109	3	do.	do.	6		Slightly herbaceous	do.	-	
5	3.0	19	-	Herbaceous	do.	-		-	do.	-	
6	5.0	6	-	Grass	do.	-		-	do.	-	

TABLE 5

RESULTS OF 1938 DOSAGE TESTS OF NEW OIL MIXTURES ON SMALL RIBES ROEZLI BUSHES, CHOWCHILLA MOUNTAIN, SIERRA NATIONAL FOREST, CALIFORNIA

Plot No.	Dosages in Gallons Per Milacre: SO_2 Extract	Diesel Oil	SO_2 + Diesel Oil	Diesel Oil + Crude Oil	Number of Bushes on Plot 1938	Percent Bushes Killed	Status of Regeneration: 1939 Bushes	1939 CSS*	1940 Bushes	1940 CSS*	1940 Fruiting Bushes Removed
28	0.5				195	90	20	15	10	13	-
1	1.0				43	93	3	-	2	-	-
2	1.5				105	96	4	2	1	4	2
3	2.0				55	100	-	-	-	2	-
4	3.0				70	100	-	-	-	-	-
5	5.0				137	99	1	-	1	-	-
6	10.0				94	100	-	-	-	-	-
7		1.0			18	83	3	1	1	-	1
8		1.5			35	96	3	8	1	-	-
9		2.0			76	93	5	4	4	-	-
10		3.0			56	100	-	-	1	-	-
11		5.0			59	100	-	-	-	-	-
12		10.0			35	100	-	-	-	-	-
13				1.0	58	71	17	54	25	26	-
14				1.5	94	91	8	17	10	9	-
15				2.0	21	81	4	9	4	13	-
16				3.0	109	100	-	1	-	-	-
17				5.0	110	95	5	1	4	8	1
18				10.0	65	100	-	-	-	-	-
29			0.5		57	100	-	24	4	38	-
19			1.0		77	92	6	93	19	46	-
20			1.5		210	94	13	22	22	14	-
21			2.0		23	96	1	7	1	36	-
22			3.0		46	100	-	3	1	3	-
23			5.0		127	100	-	-	-	5	-
24			10.0		135	100	-	-	-	-	-
25	Controls				209	None	212	87	190	41	13
26	do.				25	None	25	137	27	96	13
27	do.				170	None	202	81	156	15	12

*CSS=current season seedlings

FIGURE 1

RIBES ROEZLI SEEDLINGS ON MILACRE

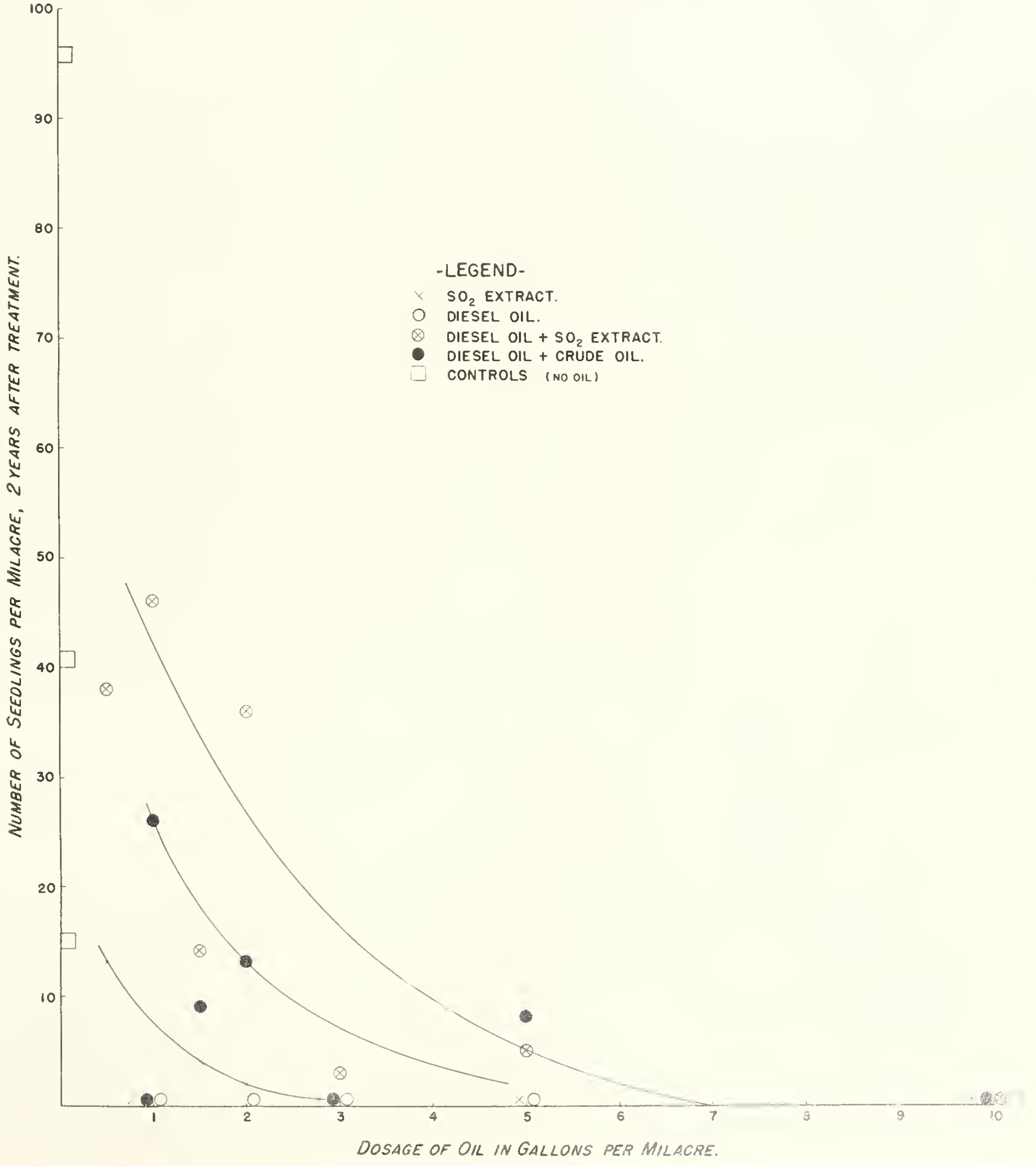
OIL PLOTS TWO YEARS AFTER TREATMENT

CHOWCHILLA MOUNTAIN

SIERRA NATIONAL FOREST

CALIFORNIA

-1940-



L P W

METHODS WORK UNDERTAKEN DURING THE 1940 FIELD SEASON

Testing of Safety Devices

A mechanical safety catch and a canvas safety belt devised for use in Ribes eradication work were developed at Berkeley (see plate 1). A shock absorber called the Safe-Hi was purchased from the Rose Manufacturing Company of Denver, Colorado. This device was made of cast aluminum and cost $12.14. All of this equipment, intended to safeguard the workers eradicating Ribes in dangerous ground, was tried out in southern Oregon the latter part of May and proved satisfactory. The minor hazards of working low rocks, railroad cuts, and steep slopes hardly justify slowing down the work with the use of these mechanical safety devices. In many of these instances a rope support is adequate. In very dangerous places, however, the use of these special safety measures is recommended.

Ribes Flower Specimens and Pictures

Specimens of most of the southern Oregon Ribes species were collected while in the flowering stage and photographed. The object of the work was to provide material for the future preparation of illustrations in eradication and checking manuals and similar publications.

Region Six Trail Tractor and Trail Truck

The narrow-gauge tractor and truck developed by the Forest Service of Region Six was observed on the Siskiyou National Forest, Oregon, and at Portland, Oregon. The tractor unit, complete with logging winch, mull-board, and brush rake, costs around $3,000. The unit shows promise for use in Ribes eradication in the following instances: as a power plant similar to the small Caterpillar tractor now in use, as a means of lowering the high cost of horse packing of camp equipment and supplies in inaccessible areas, and as a machine for camp construction.

Money spent on trail construction is more of a long term investment for future utilization than money spent on horse packing which has no re-use value.

The testing of the small tractor and truck unit on a blister rust control project is strongly recommended.

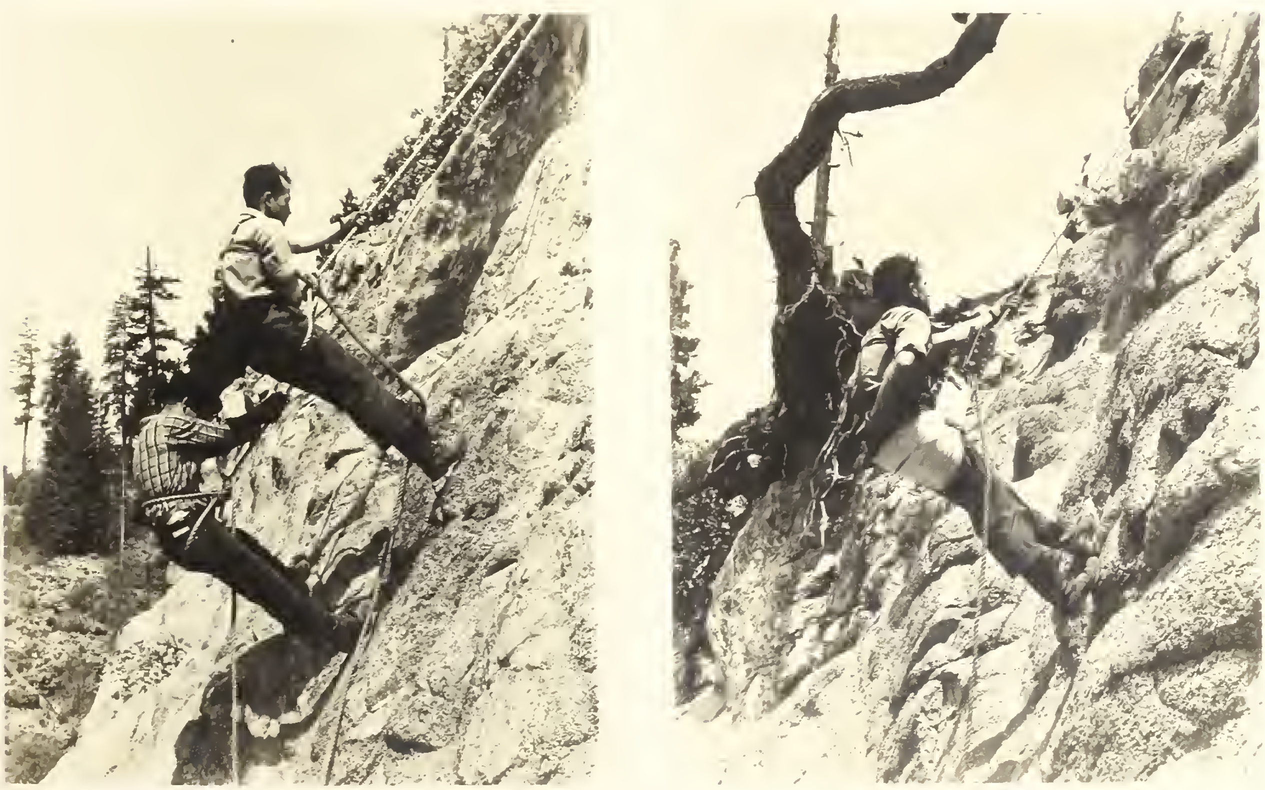
Preeradication Survey of the South Umpqua River Drainage

A preeradication survey of the upper drainage of the South Fork of the Umpqua River, Umpqua National Forest, Oregon, was made by C. P. Wessela, L. Anderson, and L. P. Winslow during the period September 23 to October 25. A special report on the responsibility of the methods organization in this work was prepared by L. P. Winslow on October 30, 1940. A complete report will also be made available by C. P. Wessela. A recapitulation of conclusions relating to methods work is given below.

Rope work - Rock outcroppings and steep bluffs along the main

PLATE 1

Rock and steep cliffs call for special methods and equipment in ribes eradication work. Upper left shows use of oil and upper right the dry chemical on decapitated crowns. W 2657. Lower left shows rope safety slings (bowline on the bight for upper worker and triple bowline for lower worker). W 2659. Lower right shows canvas safety sling and mechanical safety catch.



creeks bear many troublesome Ribes. Ropes will be needed to carry on safe and effective eradication work in such places. A person familiar with rope work and rock type eradication should be on hand to train and supervise the crews at the start of the season, both in rope work and the application of chemical to rockbound Ribes crowns.

Chemical work - Either oil or dry chemical will be needed for effective eradication of rockbound bushes. *R. cruentum* and *R. sanguineum* are the principal Ribes species growing in rocky sites. The methods unit should collaborate with operations in early season training of crews regarding methods of applying chemical.

At the head of Fish Lake, Sierra National Forest, there is an area bearing considerable *R. bracteosum* which should probably be hand pulled or dug because of the high recreational use of this particular spot. Otherwise chemical might be considered for the job.

Blasting work - In a few restricted areas, dynamite may prove advantageous in the eradication of Ribes bushes partially covered by road fills or by rock slides along creek beds. One small area along Dumont Creek shows considerable erosion following a burn.

Camp units - The areas lightest in Ribes will be covered rapidly by the eradication crews. After discussion with C. P. Wessela, plans were made to design a mobile pack camp unit (15-20 men) which could be moved and set up with a minimum loss of time and small expenditure of man days and pack horse days, and which at the same time would provide a reasonable amount of comfort for the eradication crew. A unit which a 9-horse pack string could readily move three to four miles in one day would prove satisfactory.

The small trail tractor and narrow gauge truck developed by the Forest Service in Region Six could be used to advantage for widening trails along the major streams, building trails to local areas, and for the transportation of camp equipment and provisions. The high cost of horse packing where considerable amounts of heavy materials are involved strongly suggests that the small trail tractor and truck unit should be considered when plans for Ribes eradication of the South Umpqua district are drawn up.

Future study of area - It is proposed to make a more detailed study of Ribes conditions in the area in 1941 and, should an eradication project get under way, to work closely with the eradication forces in an attempt to anticipate problems and be ready with their solution as the work progresses.

Use of Dynamite in Yosemite National Park

Early in the season a demonstration of dynamite methods for the eradication of large *R. nevadense* was made near the Crane Flat CCC Camp, Yosemite National Park, California. Later the Park Service continued the use of powder to good advantage; altogether, about 400 pounds of powder were used. A large tractor (50-60 h.p.), equipped with a drum, was tried, but the sides of the gullies in which the Ribes grew made the maneuvering

of the machine too complicated and difficult for effective work.

Fencing

Heavy duty barbed wire fences were built around the 1/10-acre grazing and ecology plots established in 1940. During the establishment of the Chowchilla Mountain grazing plot, the fencing on the milacre oil spray plots established there in 1938 was overhauled and put in first-class shape.

Oil Treatment of Rockbound Ribes, Lassen Volcanic National Park

The Lost Creek CCC Camp at Lassen Volcanic National Park, California, completed initial eradication of Ribes on a steep rocky lava flow near Chaos Crags. Diesel oil was carried in 5-gallon knapsack tanks with gravity delivery nozzles and all rockbound Ribes crowns were cut off and given a liberal dosage of oil. A typical CCC oiling crew is shown in plate 1. The crews were given careful instruction on how to decapitate and treat such troublesome bushes. The work appears to be much better than the 1939 work in the same area. A thorough examination of the area will be made in 1941 to determine reasons for the survival of treated bushes.

Dry Chemical Treatment of Rockbound Ribes, Siskiyou National Forest, Oregon

About 200 pounds of borax-sodium chlorate mixture were used on the decapitated crowns of rockbound Ribes in the Swede Basin area, Siskiyou National Forest, Oregon. The work was done with CCC and ECW labor.

Trial of Burning Torch for Eradication of Large Ribes roezli

The latter part of October, Benton Howard and Ralph James carried out experimental burning tests on large R. roezli growing in both soil and rock. The bushes were located in the Granite Basin area near Bucks Lake, Plumas National Forest, California.

A kerosene torch known as a Ker-o-Kil Special Weed Burner was used. The fuel tank had a capacity of three gallons. Two types of treatments were involved in these tests, namely, direct burning of the Ribes crown with the torch flame, and ignition and heating of the Ribes crown after it had been soaked with crude oil. The Ribes bushes were not decapitated. In some instances, however, the bush crown was exposed by scraping away the soil, thus permitting the torch flame to be applied directly to the crown.

Bushes were staked and numbered, and torch application time and oil dosages were recorded. Direct application of the torch flame to the several Ribes crowns varied from 1/2 minute to 5 minutes; oil dosages was 1/2 quart or one quart in the case of the torch burned crowns. A total of 41 bushes was treated. Twenty-five bushes were directly burned by the torch flame, 15 bushes had oil poured around the crown before they were burned by the torch, and one bush was oiled, set afire, and allowed to burn out.

Further developmental work along this line is planned, especially in respect to the design of a portable outfit which would permit convenient control of the size and temperature of the flame. The Forest Service of Region One has successfully used a propane gas torch for brush and weed burning. This torch, which ignites without preheating, will be tried if the above preliminary tests show merit.

FIELD STUDY OF THE RELATIVE MERITS OF REGULAR STRINGING AND PRE-STRINGING

During the field season of 1940, a study on the relative merits of regular stringing and pre-stringing was planned and executed under the joint supervision of the operations and methods groups. With the collabora- of Roy Blomstrom and Benton Howard, the field records were segregated and recorded by the campbosses at Beaver Creek, Stanislaus National Forest; at Ice House, Eldorado National Forest; and at Prattville, Round Valley, Ohio Valley, and Big Bar on the Plumas National Forest. Data were obtained to determine the difference, if any, between the laying of crew work lanes by the crews themselves as they worked the strip (regular stringing), and the laying of crew work lanes in advance of crew work (pre-stringing).

The pre-stringing was usually done by a special stringing crew of one or more members. In some instances the work crew laid their own advance string, for three to six lanes, and then followed up with the eradication of these lanes. Data were kept by one-quarter sections or on equivalent natural boundary work areas. A checkerboard system was used for the selection of areas for the two methods of stringing. Table 6 shows the scope of the study.

To date it has not been possible to make more than a partial analysis of the data from the reeradication work performed by the Bureau. To avoid delaying the annual report, the scope of the work (Table 6) and a summary of the raw data from the Bureau camps (Table 7) are here presented together with a discussion of general trends shown by the data.

TABLE 6

SCOPE OF FIELD STUDY ON RELATIVE MERITS OF REGULAR STRINGING AND PRE-STRINGING

Agency	Status of Control	Acres Worked Regular Stringing	Acres Worked Pre-Stringing	Total Acres Worked by Both Methods
U. S. Forest Service	Initial	320	320	640
U. S. Forest Service	Reeradication	1,175	1,105	2,280
Bureau of Entomology and Plant Quarantine	Reeradication	8,308	6,103	14,411
Total - - - - - - - - - - - - -		9,803	7,528	17,331

TABLE 7

COMPARISON OF PRODUCTION AND EFFICIENCY OF ERADICATION WORK FACILITATED BY REGULAR STRINGING AND PRE-STRINGING

Item No.	Item	Regular Stringing					Pre-Stringing					Summary		
		Pratt-ville	Beaver Creek	Ice House	Aver-age	Total	Pratt-ville	Beaver Creek	Ice House	Aver-age	Total	Dif-fer-ence	Aver-age	Total
1	Acres worked	3,779	2,013	2,516	-	8,308	2,891	1,708	1,504	-	6,103	-	-	14,411
2	Man hours expended	21,144	7,376	9,561.5	-	38,081.5	16,783	6,078.5	5,977.5	-	28,839	-	-	66,920.5
3	Ribes removed	396,203	23,686	91,212	-	511,101	307,253	22,313	48,431	-	377,997	-	-	889,098
4	Man hours per acre	5.59	3.66	3.80	4.58	-	5.80	3.56	3.97	4.72	-	.14	4.64	-
5	Ribes per acre	104.84	11.76	36.25	61.52	-	106.28	13.06	32.20	61.94	-	.42	61.69	-
6	Ribes per man hour	18.74	3.21	9.54	13.42	-	18.31	3.67	8.10	13.11	-	.31	13.28	-
7	Acres to pass First check	2,707	1,452	1,912	-	6,071	1,865	1,252	1,011	-	4,128	-	-	10,199
8	Percent acres to pass First check	71.63	72.13	75.99	73.07	-	64.51	73.30	67.22	67.64	-	5.43	70.77	-
9	Man hours prior First check	16,713	5,975	8,348.5	-	31,036.5	12,202	5,279	5,315	-	22,796	-	-	53,832.5
10	Percent hours prior First check	79.04	81.00	87.31	81.49	-	72.70	86.85	88.92	79.04	-	2.45	80.44	-
11	Number Ribes dug prior First check	366,124	22,486	85,667	-	474,277	279,447	21,145	46,439	-	347,031	-	-	821,308
12	Percent Ribes dug prior First check	92.41	94.93	93.92	92.79	-	90.95	94.76	95.89	91.81	-	0.98	92.37	-
13	Man hours pre-stringing	-	-	-	-	-	1,392.5	827	680	-	2,899.5	-	-	-
14	Acres per man hour	-	-	-	-	-	2.075	2.055	2.212	-	-	-	2.105	-
15	Percent man hours laying string	-	-	-	-	-	8.30	13.60	11.37	10.05	-	-	-	-

TABLE 7 (CONTINUED)

COMPARISON OF PRODUCTION AND EFFICIENCY OF ERADICATION WORK FACILITATED BY REGULAR STRINGING AND PRE-STRINGING

Item No.	Item	Regular Stringing					Pre-Stringing					Summary		
		Pratt-ville	Beaver Creek	Ice House	Aver-age	Total	Pratt-ville	Beaver Creek	Ice House	Aver-age	Total	Dif-fer-ence	Aver-age	Total
	REWORK DATA													
16	Acres reworked	1,072	561	604	-	2,237	1,026	456	493	-	1,975	-	-	4,212
17	Ribes removed	30,079	1,200	5,545	-	36,824	27,806	1,168	1,992	-	30,966	-	-	67,790
18	Man hours expended	4,431	1,401	1,213	-	7,045	4,581	799.5	662.5	-	6,043	-	-	13,088
19	Ribes per acre	28.06	2.14	9.18	16.46	-	27.10	2.56	4.04	15.68	-	0.78	16.09	-
20	Ribes per man hour	6.79	0.86	4.57	5.23	-	6.07	1.50	3.01	5.12	-	0.11	5.18	-
21	Man hours per acre	4.13	2.50	2.01	3.15	-	4.46	1.75	1.34	3.06	-	0.09	3.11	-
22	Acres per man hour	0.242	0.400	0.497	0.317	-	0.224	0.571	0.746	0.327	-	0.01	0.321	-
23	Acres per six-hour man day	1.452	2.4	2.982	1.902	-	1.344	3.426	4.476	1.962	-	0.06	1.926	-

Discussion

Items 1-3 of Table 7 are self-explanatory. Items, 4, 5, and 6 show the reduction of the raw data to camp averages and to total averages by methods of work. The apparent differences between methods are slight. Items 7 and 8 show that work by regular stringing yields a higher percentage of acres which pass the first regular check; Beaver Creek Camp is an exception to this generalization because it showed a difference of 1.17 percent in favor of pre-stringing. Items 9 and 10 show that pre-stringing required a slightly greater percent of total man hours for rework, this indicating a small factor favoring regular stringing. Items 11 and 12 show a total of 92.37 percent of all Ribes dug, were dug prior to the first check, leaving 7.63 percent of all Ribes for rework. In item 12, averages of the three camps favor regular stringing. Items 13-15 show the man hours and acreage covered by the pre-stringing crews; the figures deal only with the laying of string. Items 2 and 4 include item 13.

Items 16-23 of Table 7 deal with the work required to bring the remaining areas (those which did not pass the first regular check) to control standards, i.e., to pass a final check. In general, the inference can be drawn that string laid in advance by a trained stringing crew remains in better shape for rework than string laid during the initial eradication work.

Summary

As a whole, the results of the regular stringing versus pre-stringing tests show such small differences between the two methods that factors other than production costs could safely be used in making a choice between the two methods. Production costs slightly favor regular stringing. At present nothing can be said regarding the absolute efficiency of the two methods.

A statistical analysis for variance of the two methods by Ribes population classes on the basis of acres and man days shows no significant difference between methods. A complete statistical analysis of the data will be presented later in a special report.

STATUS OF RECOMMENDATIONS ON SPECIAL METHODS OF RIBES ERADICATION AND NEW DEVELOPMENTS OF 1940

Recommendations

No changes are made in recommendations for methods and equipment given as items (1) to (5):

(1) Light or medium weight claw mattock.
(2) Use of dynamite.
(3) Broadcast spraying with Atlacide or Diesel oil.
(4) Bulldozer methods for brush removal in stream type.
(5) Use of D-2 Caterpillar tractor equipped with front end brush rake and rear end power hooks.

For a description of these methods and recommended equipment, reference should be made to the 1939 annual reports for the Sugar Pine and Northwestern Regions.

Decapitation and Chemical Treatment of Ribes

Recommendations are the same as given in 1939 report for oil work and for methods of applying dry chemical. In the latter, however, a new formula is given. Use a mixture of 1 part by weight of borax (tech. powder), and 1 part by weight of common salt (vacuum refined table and dairy salt).

Developments of 1940

In reviewing the results of the 1940 field season, the following observations and conclusions refer briefly to the newer developments which may find practical application in the control of blister rust.

No special comments are made at this time regarding the bulk of the ecology studies (Ribes regeneration in relation to fire, logging, timber management, and eradication methods).

(a) Results of pollination tests on Ribes flowers definitely show that wild Ribes are rarely, if ever, self-fertile and that cross-pollination must occur before such plants can produce mature fruits. This conclusion has an important bearing on long-range planning of eradication work and gives promise that continued man-caused reduction in Ribes populations should be aided in its final stages by natural phenomena.

(b) Results of the 1939 tests with dry chemical offer for consideration a mixture of dry borax and common salt as a definite improvement over the chlorated borax or straight borax as previously recommended. The new mixture of borax and common salt should have wider application in all regions, especially on National Park land where considerable importance is attached even to a rumor that a chemical may be toxic to wild life. The new mixture has the further advantages of being cheaper and easier to handle than the one previously used.

(c) Several new tools of the peavey type have been tested and

found useful for eradication work in thickly populated stands of _Ribes roezli_ (or any Ribes difficult to dig) where the work is heavy and slow with the regular mattock.

(d) The investigations that were made regarding the operation of the small trail tractor designed by Region Six of the Forest Service have drawn our attention to a type of equipment which conceivably would make an effective contribution to the blister rust program for camp construction work, for the servicing of small camps away from motor roads, for construction of trails, for cutting manways in brush fields, and finally, for the actual eradication of large troublesome Ribes. One of these special tractors equipped with a single drum logging winch and a brush rake (to be replaceable with a mull-board for trail construction) would cost $3,000. It is to be hoped that either the Bureau or the Forest Service can assign such a tractor to blister rust work in the Far West during 1941.

(e) The effectiveness of hand grubbing work was improved by employing the D-2 Caterpillar tractor to make manways across troublesome brush fields. Manways were cut some six weeks ahead of the regular crew eradication work, thus permitting broken-off Ribes crowns to sprout.

(f) A canvas safety sling and a mechanically operated safety catch were devised for the protection of workers in steep, hazardous terrain. The equipment was used in Oregon early in the summer of 1940 and found to be satisfactory. Details of these special safety devices, as well as data on the care and use of ropes, are given in Serial No. 105 by L. P. Winslow.

LABORATORY AND GREENHOUSE WORK, NOVEMBER 1939 TO MAY 1940

Laboratory and greenhouse work undertaken at Berkeley during the winter of 1939-40 included: (a) routine care of the Ribes Garden and the greenhouse; (b) conduct of self- and cross-pollination tests on Ribes Garden plants; (c) preparation of special photographic material for research reports; (d) continuation of Ribes seed germination tests. Reference should be made to the following reports for details of these special activities at Berkeley. A brief statement is here appended to each of the special reports completed during the period November 1939 to May 1940, giving the practical significance of the findings.

Serial No. 104

The Function of Tannin in Host-Parasite Relationships With Special Reference to Ribes and *Cronartium ribicola*.

.... H. R. Offord

This report gives a subject-matter summary of all data pertaining to the tannin content of Ribes species. By distributing this report to technical workers in universities and experiment stations, we hope to stimulate academic research on the mechanism of disease resistance in Ribes and *Cronartium ribicola*.

Serial No. 105

The Use of Ropes in Ribes Eradication Work.

.... L. P. Winslow

A reference manual which provides a convenient summary of data relating to: the strength and care of rope, methods of tying knots useful in camp and field work, and instructions for the care of workers along cliffs and other hazardous places. Descriptions are given of safety slings and a specially devised mechanical safety catch for safeguarding a worker suspended on a rope.

Serial No. 106

Fluids for the Preservation of Flowers and Fruits.

.... C. R. Quick

Describes results of 5-year tests on solutions for preserving the color of flowers and fruits of various Ribes and recommends the following all-purpose preservative: 100 cc. of solution containing 6 cc. formaldehyde (40%), 25 cc. boric acid (4%), 4 cc. copper sulfate pentahydrate (10%), 4 cc. ethyl alcohol (95%), and 61 cc. water.

Serial No. 107

Experimental Germination of Ribes Seeds. Series of 1939.

.... C. R. Quick

Reports seed germination tests in various soils collected from white pine areas in Idaho, Oregon, and California. Data show that there was no soil which prevented Ribes seed from germinating. The growth rate of seedlings and the green weight of seedlings grown in the various soils were generally high for those cultures which showed highest germination of seed. No consistent relationship was shown between the Ribes population of the soil as collected in the field and the ability of that soil to grow Ribes seedlings under experimental conditions.

Papers published during 1940, or those approved for outside publication, are as follows:

"Chemical and Mechanical Methods of Ribes Eradication in the White Pine Areas of the Western States."
--H. R. Offord, G. R. Van Atta, and H. E. Swanson, U.S.D.A. Tech. Bull. No. 692, Jan. 1940.

"Blister Rust Control in the Management of Western White Pine."
--Kenneth P. Davis and Virgil D. Moss
Station Paper No. 3. Nor. Rocky Mountain For. & Range Exp. Sta. June 1940.

"A Key to the Ribes of California."
--Clarence R. Quick
Bur. Ent. & Plt. Quar., MS 5166, Berkeley, Calif. Oct. 15, 1940.

In the spring of 1940, tests were made on the hand pollination of R. roezli, R. glutinosum, and R. gracillimum growing in the Ribes Garden at Berkeley. Those tests, as well as those subsequently made in the field in California and Idaho, show that Ribes seldom, if ever, produce mature fruits as a result of self-pollination. A report on this work is given by C. R. Quick in section 3 of the 1940 annual report for the Sugar Pine Region.

PART VI - Section 2

NEW TOOLS FOR RIBES ERADICATION AND DEVELOPMENTS IN POWER METHODS

By

John F. Breakey, Assistant Pathologist,

and

L. P. Winslow, Agent

Claw Mattocks

The claw mattocks were given additional trials in the Sugar Pine Region during the 1940 field season. As was anticipated, there was considerable difference of opinion among the users of the tools as to the best weight and style of tool for general use. In Oregon, the light weight claw mattock seemed to be preferred for nearly all classes of work. In California, the light tool appears desirable for reeradication, but heavier tools are needed for initial work. It is expected that the technical supervisors for the Sugar Pine Region will agree on the design and weight of an all-purpose claw mattock this winter and that an order will be placed for a supply of these tools for field work in 1941.

Heavy Duty Hand Tools

Prior to 1940, a prying type of tool had been designed and tested in southern Oregon and on the Sierra National Forest, California. The special function of this tool is to furnish the worker with greater leverage than is obtained from the regular mattock. Several new tools of the prying type (referred to in this report as a Ribes peavey) were made and tested during the 1940 season. In all tools, peavey handles were fitted into an iron pipe shank about 2" in diameter, and a wide flat sheet of steel was employed to act as a prying fulcrum, as shown in Plate 2 (upper left and upper center). Both two- and three-pronged tools were tried; the three-pronged tool is satisfactory for *Ribes roezli* but the two-pronged tool works best on single large crowned bushes such as *R. nevadense*, *R. sanguineum*, and *R. lobbii*. In the two lower pictures of Plate 2, the three-pronged peavey is shown in action for the eradication of *R. roezli*. An "up and over" action tool, as shown in Plate 2 (upper center), was designed for application of pulling power through a greater distance, but this tool was not completed early enough to test it in the field. A Paul Bunyan style claw mattock (upper right Plate 2) was also made. Preliminary tests showed that this latter tool also worked satisfactorily.

These new heavy, peavey-handled tools are not intended to replace the regular pick mattock or claw mattock for widespread field use, but are for special use in troublesome areas of large Ribes where ordinary

hand tools are inadequate and where mechanical equipment is not available. Obviously a 15-pound tool with a 5-foot handle would be awkward to carry up a steep hill through brush.

The peavey type tools have some interesting possibilities for speeding up work in problem areas, and with improvement of design, a useful tool can be obtained that will remove the large bushes without excessive digging and without the ground disturbance that is often involved in the use of the regulation size mattock.

New Power Ribes Hook

During the 1939 tests, the power hook drawn by the tractor winch proved satisfactory except that the chrome vanadium steel teeth broke on several occasions. Replacement of the teeth was expensive and caused annoying delays in the field work. A power hook with replaceable teeth (shown in lower left of Plate 3) was constructed in the spring of 1940 and used during the field season.

The new six-toothed power hook for use with the D-2 Caterpillar tractor was put into service at Soquel, Sierra National Forest, California. Improvements over the 1939 model hooks were: replaceable teeth, shorter teeth, and longer draw bar arms. The performance of the new power hook compared favorably with the types used in 1939 and in addition, the delays on account of broken teeth were eliminated. While the new hook was heavier than those developed in 1939, it pulled more steadily than either of the previous models; little additional developmental work on this type of tool is anticipated in the future.

Progress of Ribes Eradication by Power Methods

The D-2 Caterpillar tractor equipped with front end brush rake and rear drum and grapple hooks was used throughout the season by the Forest Service at Soquel, Sierra National Forest, California. Work pictures illustrating brush rake and hook technique are shown in Plate 3.

Part of the season the tractor was used to open manways through the brush (*Ceanothus cordulatus*). The brush rake designed originally for digging Ribes proved ideal for tearing out and breaking off the brush, as shown in Plate 4. Lanes were cut through the layer of brush clumps, the intention being to utilize natural or artificial lanes, crisscrossing every 10 to 15 yards. These temporary manways give the worker an opportunity to move over the area (also to the point at which work is started each day) without fighting through the dense brush all the way. Also, part of the eradication work is done in the brush-free lane. Work was not only speeded up by this use of the tractor, but the morale of the workers was kept at a high level. Brush work by hand is a depressing job even under the best conditions.

The grapple hook was used for direct eradication considerably more than the rake because of lesser soil disturbance, steep slopes, and less damage to small trees. The work was under the immediate supervision of M. L. Wells, Superintendent at Soquel CCC Camp and the general direction of J. M. Buck of the Forest Service at Northfork, and F. A. Patty. Mr. Wells is to be commended for his ingenuity in applying this multiple use of the power rig to the eradication problems at hand.

PLATE 2

Three-pronged ribes peovey. Side ond front view of the prying fulcrum.

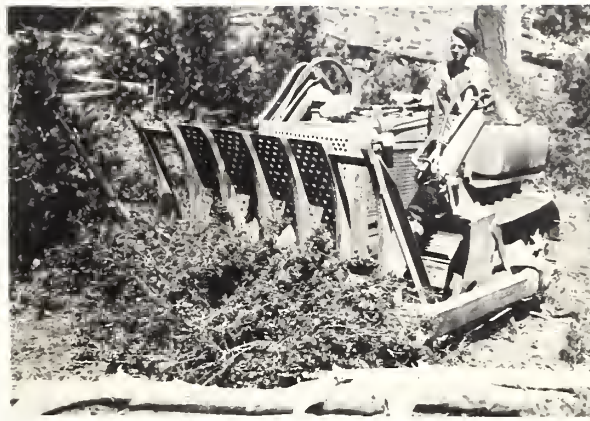
W 7. Two-pronged ribes peovey with fulcrum set in reverse position to one shown ot left.

W 6. Clow mattock design in peavey size

Ribes peavey shown upper left in use for eradicotion of R. roezli. Note how cleonly the roots ore removed.

PLATE 3

Detail of rake construction and hydraulic lift. D-2 tractor.



Eradication of large *R. roezli* by direct action of brush rake.

In the course of brush stripping for manways (see plate 4) a large *R. cereum* is encountered (left) and uprooted (right).

Six-tooth ribes hook, 1940 model. Teeth replaceable.

Rear end hook work on *R. roezli*.

PLATE 4

Making manways through a brush field, Sierra N. F., California, 1940. The D-2 caterpiller tractor at work

The brush is broken off at ground level (left) leaving an accessible route (right) for eradication crews.

PART VI - Section 3

RIBES ECOLOGY IN CALIFORNIA, 1940

By

Clarence R. Quick, Assistant Pathologist

The ecology report for 1939 presented a rather full discussion of all data collected from the 1.6-acre Ribes seedling occurrence plot, in addition to the data obtained in 1939 from the several other ecology studies being conducted in the Sugar Pine Region. This year, in addition to current data on the several other studies, a summary discussion of data from the ten-acre fenced Cow Creek regeneration plot (C.F.E.S. MC#5) will be presented.

A topic outline of the present report follows:

(1) The Cow Creek ten-acre regeneration plot.
(2) Occurrence of Ribes seedlings on eradicated areas.
(3) Survival and growth of Ribes seedlings on eradicated areas.
(4) Occurrence and growth of Ribes on burns.
(5) Square-chain Ribes-in-brush regeneration plots.
(6) One-acre Ribes regeneration plots.
(7) Ribes regeneration in grazing exclosures.
(8) Experiments on the cross- and self-pollination of Ribes.

Special attention is directed to a brief discussion of the status of each of the above topics as given under the subheading "Status of Study" throughout the text of this report.

The competent assistance of John T. Foley, both in the collection of data in the field and in the summation and compilation of data in the office, is gratefully acknowledged.

THE COW CREEK TEN-ACRE REGENERATION PLOT

For material previously submitted on the Cow Creek Ten-acre plot, see the annual report for 1939, pp. 139 and 153, and the citations there listed.

The Cow Creek Ten-acre plot is located just west of the Sonora Pass Highway a short distance southwest of the Cow Creek Guard Station. A diagram of the plot is shown on page 127 of this report. The plot, MC#5 of the California Forest Experiment Station's series of experimental plots, is in the vicinity of their station on the South Fork of the Stanislaus River.

The plot was established to study the behavior of a Ribes population consisting predominantly of _Ribes roezli_, on a logged area from which grazing was excluded. From observations in the same general area, it was assumed that brush, principally snowbrush (_Ceanothus cordulatus_), manzanita (_Arctostaphylos patula_), and bear clover (_Chamaebatia foliolosa_), would thicken appreciably following logging. It was contemplated that the Ribes would eventually decline, that they might even be displaced, by the full development of the brush and regenerating forest.

The plot lies on a gentle to medium westerly-facing slope at an altitude of from 5,840 to 5,930 feet. It was logged by Pickering Lumber Company under strict Forest Service supervision in 1923. The plot was fenced in 1927, and has been kept well fenced ever since.

The Experiment Station and the Division of Forest Pathology, in addition to the Blister Rust Control Office, have studied conditions on the plot since its establishment. The detailed redevelopment of vegetation, the disintegration of debris and the disappearance of piled logging debris, the growth of trees, the dispersal of seed from conifer seed trees, and the production of conifer seed have been some of the studies conducted.

The Ribes averaged 2.6 per acre after logging in 1923. In 1928, Frank A. Patty and his ecology crew of the Blister Rust Control Office, carefully checked the plot and found 7.8 Ribes per acre. All the bushes found in 1928 were numbered and staked for study. In addition to numerous plants of _R. roezli_, two bushes of _R. cereum_ and one of _R. viscosissimum_ were found on the plot. Table 1 summarizes the data collected during the period from 1928 to 1937.

The plot was periodically inspected by Mr. Patty during the period 1928-1931, by George A. Root during the period 1933-1936, and by C. R. Quick from 1937 to the present. The discontinuity of the work has caused some lack of agreement in results, but the principal objectives of the study have been retained.

In 1937 the corners of the 100 square-chain (0.1-acre) subplots, into which the ten-acre plot had been divided by Patty, were all marked with split cedar stakes. The data collected in 1937 included for each known Ribes bush the following items: (1) species, (2) estimated size in feet of live stem, (3) amount of dead stem, (4) number of fruits, (5) estimated general vigor by visual inspection, (6) most closely associated (competing) plants, (7) location, and (8) remarks. To reduce the amount

DIAGRAM OF
COW CREEK TEN ACRE PLOT (C.F.E.S., MC NO. 5)
STANISLAUS NATIONAL FOREST, CALIFORNIA.

SCALE IN CHAINS
0 1 2 3

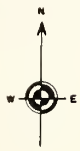
-LEGEND-

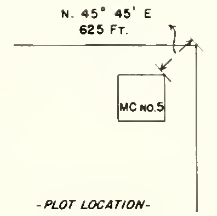
SUBPLOTS CHECKED ANNUALLY

SUBPLOTS TO BE CHECKED AT 5 YEAR INTERVALS

81 SERIAL NUMBER OF SUBPLOT

7 NUMBER OF RIBES PLANTS WITHIN SUBPLOTS





-PLOT LOCATION-
NE 1/4 SEC. 4 T. 4 N. R. 18 E.
(ORIGINAL G.L.O. SURVEY)

100 4	81 0	80 2	61 9	60 4	41 3	40 7	21 2	20 12	1 2
99 1	82 0	79 2	62 6	59 24	42 4	39 0	22 0	19 2	2 0
98 5	83 16	78 6	63 4	58 6	43 0	38 2	23 1	18 3	3 3
97 6	84 11	77 11	64 26	57 1	44 6	37 4	24 2	17 1	4 0
96 6	85 4	76 4	65 8	56 4	45 8	36 6	25 5	16 2	5 1
95 0	86 0	75 0	66 0	55 2	46 7	35 0	26 1	15 1	6 7
94 0	87 0	74 0	67 1	54 3	47 0	34 0	27 3	14 0	7 3
93 1	88 0	73 0	68 1	53 1	48 4	33 0	28 0	13 1	8 0
92 0	89 0	72 0	69 0	52 1	49 0	32 1	29 0	12 0	9 0
91 0	90 0	71 0	70 3	51 2	50 0	31 1	30 6	11 0	10 0

C.R.Q.

TABLE 1

RIBES BUSHES FOUND ON COW CREEK TEN-ACRE RIBES REGENERATION PLOT
1928-1937

Year of Inspection	Staked Bushes Found Dead	Previously Unknown Bushes Staked	Total Fruiting Bushes Found	Non-fruiting Live Bushes Found	Total Live Bushes Found
1923	-	-	-	-	26
1928	-	80	18	62	80
1929	-	66	12	134	146
1930	7	32	-	-	185
1931	Many	-	-	-	139 1/
1933 2/	2	0	90	91	181
1934	0	4	107	78	185
1936	4	37	96	131	227 3/
1937	4	61	161	114	275

(- dash) = Data not known.

1/ This figure was "corrected" to 154 in 1933.

2/ Not checked in 1933 and 1935.

3/ Discrepancy of nine bushes in this figure, not explainable by reported data.

of labor necessary to inspect the plot ten subplots were selected in 1938 and used as a sample of the whole plot. These ten subplots are carefully inspected each year. The whole plot will be checked at intervals of five years.

Table 2 summarizes the data collected during the past several years from the known Ribes bushes growing on the selected ten square-chain subplots. The increase in number of Ribes is due not so much to an increasing number of Ribes on the area as it is to increased diligence in inspection and collection of data. The size distribution of all known live bushes at the time of careful inspection in August 1937 was as follows:

0 to 1.9	feet	=	5 plants
2 to 5.9	"	=	38 "
6 to 15	"	=	75 "
16 to 40	"	=	83 "
41 to 100	"	=	52 "
101 to 500	"	=	22 "
Total - - - -			275 plants

Table 3 summarizes for the ten-acre plot the relation between size of Ribes plants in 1937 and the species of associated plants causing (by visual estimate) the most severe competition to the Ribes plants concerned. Some of the competing plants appearing only occasionally in the compilation have been omitted from the table. In addition to its principal function the table also gives a fair idea of the understory vegetation on the plot.

Table 4 presents data on the estimated vigor of Ribes plants in relation to closely associated (competing) species of plants.

Table 5 presents certain items of data compiled and summarized from the meteorological records of the Weather Station at Lake Eleanor, the closest year-round weather station to the plot, at a comparable altitude. Also included in the table are state average precipitation data.

The four photographs on Page 134 will give the reader a fair idea of the vegetational cover and the general aspect of the plot. The pictures were taken in August 1937.

Status of Study

The density of vegetation, particularly of brush vegetation, has increased greatly since the initiation of the plot. The Ribes, however, have by no means disappeared; in fact, a relatively unimportant number of well-established Ribes plants have died from all combined causes. As far as the writer is aware, however, no bushes of 1936 origin, or of more recent origin, have become established. A very few bushes of 1935 origin are known. This would indicate either that the vegetation on the plot is so dense that Ribes seedlings all succumb to plant competition, or that the seedlings have all succumbed to the pronounced drought of recent summers. The writer inclines to the belief that the density of vegetation, working through competition for soil moisture, is the cause of this lack of seedling survival, and that in the future few or no seedling-origin Ribes plants

will become established on the plot.

As an extension of this idea it might be propounded that the careful eradication of Ribes on the plot, with as little disturbance to soil and vegetation as possible, would be followed by little or no Ribes seedling regeneration. It is hoped to test this theory in the near future by eradicating all Ribes from selected subplots. Comparisons of subsequent data from the eradicated subplots with data from an equal number of selected uneradicated subplots should answer this question in a very few years.

The estimated vigor of bushes, the increase in total live stem, and the production of fruits follow roughly the seasonal precipitation departure data given in columns 3 and 7 of Table 5. It is believed that additional work on climatological data would yield very worth while results, and might lead to some simple system of predicting the variations of Ribes vigor, particularly the survival and establishment of Ribes seedlings, in the Sugar Pine Region as a whole. The general picture presented by the seasonal cumulative precipitation departures at Lake Eleanor is quite discouraging from a Ribes eradication viewpoint in that the severe drought of the past several years has undoubtedly made Ribes suppression much simpler than it will be when the cumulative precipitation departures turn strongly positive, as they are likely to do. Positive departures should, however, greatly favor sugar pine reproduction.

OCCURRENCE OF RIBES SEEDLINGS ON ERADICATED AREAS

See the annual report for 1939: pages 130-137, 142-146, and the citations there listed.

The 1.6-acre Cow Creek seedling occurrence plot was discussed at some length in the annual report for 1939. This year from subplots I-V (0.97 acre) the following Ribes seedlings were removed; 1939 origin - 1,491 seedlings; 1938 - 398; 1937 - 77; 1936 - 15; 1935 - 3, 1934 - 1; and 1933 - 1: a total of 1,986 one year old or older seedlings. An estimated 1,690 current season (1940 origin) Ribes seedlings were observed and left on the plot. No fruiting bushes were found.

A total of 111 Ribes roezli seedlings (1940 origin - 105, 1939 - 4, 1938 - 2) were removed in June from Plot A (30 milacres, Cow Creek, Stanislaus National Forest); and a total of 425 R. roezli seedlings (1940 origin - 394, 1939 - 29, 1938 - 2) were removed from Plot B (28 milacres, Cow Creek, Stanislaus National Forest.) Data from these plots will be presented in greater detail in a subsequent annual report.

No 1940-origin seedlings were found on the Markwood Meadow series of milacres. This was somewhat of a surprise, but was apparently due to the small age and lack of fruiting of the very vigorous bushes removed from the area in 1939, and to the lack of soil-stored seed from parents of the recently eradicated Ribes.

Table 6 summarizes the current season seedlings removed from several small seedling occurrence plots.

Status of Study

The numbers of current season seedlings appearing on these plots continue to diminish, but at a relatively slow rate. In percentage decrease the results are very favorable, but in terms of actual seedlings per milacre the results are less encouraging.

At a somewhat later date, and after certain meteorological factors have been more thoroughly studied, it should be possible to project rather accurately the curve of decreasing numbers of seedlings as obtained from this study.

These plots are to be checked annually.

TABLE 2

SUMMARY OF RIBES DATA COLLECTED FROM TEN SELECTED SQUARE-CHAIN SUBPLOTS OF COW CREEK TEN-ACRE PLOT

Items of Data			Summer 1933	Summer 1934	June 1936	Aug. 15 1937	July 10 1938	Aug. 11 1939	Sept. 2[illegible] 1940
Live bushes from previous year			73	72	72	82	105	123	122
Newly located bushes			0	0	11	24	19	0	0
Bushes died within year			1	0	1	1	1	1	1
Total live bushes at check			72	72	82	105	123	122	121
Estimated vigor of fruiting bushes		Excellent	-	-	-	9	2	1	0
		Good	-	-	-	29	24	9	6
		Fair	-	-	-	22	26	15	45
		Poor	-	-	-	5	6	2	21
		Very Poor	-	-	-	0	0	1	1
Total fruiting bushes			30	39	40	65	58	28	73
Estimated vigor of non-fruiting bushes		Excellent	-	-	-	0	0	0	0
		Good	-	-	-	2	0	4	1
		Fair	-	-	-	22	36	29	25
		Poor	-	-	-	11	24	34	15
		Very Poor	-	-	-	5	5	27	7
Total non-fruiting bushes			42	33	42	40	65	94	48
Size distribution of live bushes (feet of live stem)		0-1.9'	3	1	2	2	3	2	2
		2-5.9'	17	8	5	9	16	22	16
		6-15.9'	24	24	25	29	35	29	23
		16-40'	21	20	28	36	33	34	38
		41-100'	6	13	16	21	22	24	24
		101-500'	1	6	6	8	14	11	18
Total			72	72	82	105	123	122	121
Percentage change in amount of live stem over the year before	increase	101+	-	-	-	-	2	3	20
		51-100	-	-	-	-	16	12	21
		21-50	-	-	-	-	21	25	29
		11-20	-	-	-	-	19	7	14
		1-10	-	-	-	-	1	6	2
	Same		-	-	-	-	16	17	18
	decrease	1-10	-	-	-	-	6	6	1
		11-20	-	-	-	-	14	15	7
		21-50	-	-	-	-	10	26	7
		51-100	-	-	-	-	0	5	2
		101+	-	-	-	-	0	0	0
Bushes with increased live stem			-	-	-	-	59	53	86
Bushes with some live stem			-	-	-	-	16	17	18
Bushes with decreased live stem			-	-	-	-	30	52	17
Total estimated fruits			-	-	-	4,540	1,310	255	Av.1.15[illegible]
Estimated live stem on newly found bushes			-	-	247	425	115	-	-
Total estimated live stem (feet)			1,277?	2,786	3,296	3,944	4,928	5,030	7,333
Variation of total live stem (feet)			-	+1,509	+510	+748	+984	+102	+2,303

TABLE 3

PLANTS COMPETING WITH RIBES ON COW CREEK TEN-ACRE PLOT, 1937. (TWO ASSOCIATED PLANTS ARE RECORDED FOR EACH RIBES PLANT REPRESENTED. SOME OF THE LESS IMPORTANT ASSOCIATES ARE NOT INCLUDED IN THE TABLE.)

Symbol	Associated Competing Plant	Tally count of plants competing with Ribes (by size of Ribes plants, feet of live stem as shown)						Total Tallies
		0-1.9	2-5.9	6-15	16-40	41-100	101-500	
CF	Bear clover	2	22	49	41	35	16	165
CC	Snowbrush	2	22	40	47	27	14	152
AP	Manzanita	1	7	11	19	12	3	53
FR	Fir reproduction	3	8	11	6	1	0	29
G	Grass	0	3	5	13	4	2	27
CR	Cedar reproduction	0	5	4	8	4	3	24
SM	Waxberry	1	4	4	7	3	0	19
CD	Low ceanothus	0	5	0	4	7	1	17
IH	Sierra iris	0	0	5	6	2	0	13
PA	Bracken Fern	0	1	5	5	1	0	12
RS	Ground rose	0	0	5	2	3	0	10
	Total Ribes	5	40	74	83	52	22	276

THE COW CREEK TEN-ACRE REGENERATION PLOT (MC-5)

Southeast quarter of plot. Manzanita and snowbrush in foreground.

Southwest quarter of plot. Grass and bear clover in foreground.

Northwest quarter of plot. Stakes in brush mark _R. roezli_ plants.

Near center of plot. Coniferous reproduction appearing above dense brush

TABLE 4

RELATION BETWEEN MORE IMPORTANT PLANTS COMPETING WITH RIBES AND VISUAL ESTIMATE OF RIBES VIGOR ON TEN SUBPLOTS, AUG. 15, 1937. (TWO COMPETING PLANTS ARE RECORDED FOR EACH RIBES REPRESENTED. SOME OF THE LESS IMPORTANT ASSOCIATES ARE NOT INCLUDED IN THE TABLE.)

Symbol	Associated Competing Plant	Tally count of plants associated with Ribes (Segregated on basis of estimated vigor of Ribes, 1937)						Total Tallies
		Excel-lent	Good	Fair	Poor	Very Poor	Dead	
CF	Bear clover	8	19	29	9	3	2	70
CC	Snowbrush	2	23	27	6	0	0	58
AP	Manzanita	2	12	9	0	1	1	25
CR	Cedar reproduction	1	4	11	1	2	0	19
FR	Fir reproduction	1	2	0	6	2	0	11
SM	Waxberry	0	0	4	4	2	0	10
GI	Geranium	2	0	1	3	0	1	7
	Total Ribes	9	31	44	16	5	3	108

TABLE 5

SUMMARY OF SEASONAL METEOROLOGICAL DATA AT LAKE ELEANOR, AND FOR THE STATE OF CALIFORNIA AS A WHOLE

Season (July 1-June 30)	Lake Eleanor Station: Actual Total Seasonal Precipitation (Inches)	Lake Eleanor Station: Seasonal Precipitation Departure from Average (Inches)	Lake Eleanor Station: Cumulative Seasonal Precipitation Departures (Inches)	Lake Eleanor Station: Mean Seasonal Temperature Departures (° F)	State Average: Actual Total Seasonal Precipitation (Inches)	State Average: Seasonal Precipitation Departures from Averages (Inches)	State Average: Cumulative Seasonal Precipitation Departures (Inches)
1910-11	59.35	+19.14	+19.14	-	30.76	+7.12	+7.12
1911-12	25.43	-14.78	+4.36	-	19.02	-4.62	+2.50
1912-13	27.27	-12.94	-8.58	-	19.54	-4.10	-1.60
1913-14	55.16	+14.95	+6.37	-	36.37	+12.73	+11.13
1914-15	43.92	+3.71	+10.08	-	33.69	+10.05	+21.18
1915-16	41.40	+1.19	+11.27	-	32.12	+8.48	+29.66
1916-17	44.63	+4.42	+15.69	-	23.85	+0.21	+29.87
1917-18	31.68	-8.53	+7.16	-	18.86	-4.78	+25.09
1918-19	35.46	-4.75	+2.41	-	23.59	-0.05	+25.04
1919-20	30.21	-10.00	-7.59	-	19.12	-4.52	+20.52
1920-21	40.81	+0.60	-6.99	-	28.80	+5.16	+25.68
1921-22	36.72	-3.49	-10.48	-	27.69	+4.05	+29.73
1922-23	40.08	-0.13	-10.61	-	22.53	-1.11	+28.62
1923-24	20.83	-19.38	-29.99	-	11.56	-12.08	+16.54
1924-25	48.15	+7.94	-22.05	-	24.93	+1.29	+17.83
1925-26	31.60	-8.61	-30.66	-	21.28	-2.36	+15.47
1926-27	46.35	+6.14	-24.52	-	29.75	+6.12	+21.59
1927-28	44.01	+3.80	-20.72	-	20.99	-2.65	+18.94
1928-29	29.45	-10.76	-31.48	+1.1	16.87	-6.77	+12.17
1929-30	30.49	-9.72	-41.20	+3.4	19.56	-4.08	+8.09
1930-31	29.99	-10.22	-51.42	+3.5	15.11	-8.53	-0.44
1931-32	52.14	+11.93	-39.49	+0.8	24.36	+0.72	+0.28
1932-33	32.34	-7.87	-47.36	+0.6	16.71	-6.93	-6.65
1933-34	28.70	-11.51	-58.87	+5.8	16.30	-7.34	-13.99
1934-35	54.99	+14.78	-44.09	+1.7	26.29	+2.65	-11.34
1935-36	48.06	+7.85	-36.24	+2.3	24.70	+1.06	-10.28
1936-37	47.78	+7.57	-28.67	+0.6	25.65	+2.01	-8.27
1937-38	64.61	+24.40	-4.27	+1.7	34.12	+10.48	+2.21
1938-39	30.79	-9.42	-13.69	+1.9	16.15	-7.49	-5.28
1939-40	54.08	+13.87	+0.18	-	28.95	+5.31	+0.03
Average	40.21 1/	9.48 2/	-	-	23.64 1/	5.16 2/	-

1/ Average for the thirty seasons - 1910 to 1911 through 1939-40.

2/ Average deviation from arithmetical mean.

TABLE 6

SUMMARY OF CURRENT SEASON (1940-ORIGIN) RIBES SEEDLINGS FOUND ON MILACRE SEEDLING OCCURRENCE PLOTS

Milacre Number	Chowchilla Mountain, Sierra National Forest: 1938 Milacres 6/10/40	1939 Milacres 6/10/40	Plot E 6/10/40	Plot F 6/10/40	Cow Creek Camp Site Milacres, Stanislaus National Forest 6/20/40	Spanish Ranch Ridge Milacres Plumas National Forest 7/12/40
1	175	746	195	35	54	0
2	301	180	135	70	147	41
3	565	895	45	95	231	3
4	175	410	45	30	15	3
5	385	175	95	30	22	17
6	73	-	15	55	39	12
7	46	-	85	45	12	14
8	11	-	70	55	34	13
9	10	-	30	45	8	4
10	586	-	80	80	8	7
11	-	-	320	115	-	-
12	-	-	165	55	-	-
Totals	2,327	2,406	1,990	1,280	570	114

SURVIVAL AND GROWTH OF RIBES SEEDLINGS ON ERADICATED AREAS

See annual reports 1937: pp. 131-136; 1938: pp. 111, 113, 114; and 1939: pp. 137-138, 147-149 for previously submitted material.

This series of plots includes the following: (1) Butt Creek #1 (25 milacres, Butt Creek, Plumas National Forest), (2) Butt Creek #2 (24 milacres, Butt Creek, Plumas National Forest), (3) Plot C (21 milacres, Cow Creek, Stanislaus National Forest), (4) Plot D (4.875 milacres, Cow Creek, Stanislaus National Forest), (5) Plots E and F (24 milacres, Chowchilla Mountain, Sierra National Forest), and (6) Plot G (24 milacres, Chowchilla Mountain, Sierra National Forest).

Table 7 summarizes the current data from several of these plots.

In the past all non-fruiting Ribes were left on Plot C. This year, to economize on the time necessary to collect data from this plot in the future, all Ribes were removed and carefully inspected for year of origin. The fruiting vigor of Ribes on this plot is and has been consistently low. This year, it will be observed, only five plants were fruiting out of the 588 plants three or more years old.

From Plot G this year were removed 199 fruiting Ribes plants with 2,107 feet of estimated live stem (average 10.6 feet per plant), and with 7,030 estimated fruits (average 35 fruits per plant).

Status of Study

In general the survival of Ribes seedlings has followed rather closely the abundance or scarcity of seasonal precipitation. Reasons for annual irregularities in the intensity of occurrence of Ribes seedlings are as yet obscure, but should become apparent as the study progresses.

These plots are to be checked annually.

OCCURRENCE AND GROWTH OF RIBES ON BURNS

See annual reports 1938: pp. 111-112, 115, and 1939: pp. 138-139, 150-152 for previously submitted material.

On the Cow Creek spot burn plot there are not 105 staked seedling-origin Ribes roezli plants. In addition, there were in the spring of 1940, forty known unstaked plants, all of 1938 origin. No seedlings of 1939 or 1940 origin had survived to September 1940; and up to that time none of the 1938 origin plants had fruited. Only one bush of the 105 was larger than three feet of live stem.

On the burned portion of the Cow Creek 5.6-acre plot (C.F.E.S., MC#12) there are now 342 seedling-origin staked Ribes plants that are being studied for growth and development. The bushes were staked and added to the list of bushes studied as fast as they had accumulated vigor sufficient to establish themselves. The seedlings were added to the list as follows: 1937 - 74 seedlings; 1938 - 101; 1939 - 134; and 1940 - 56. A total of 23 of these 365 plants died since they were staked. The year of origin distribution of the total list is as follows: 1937 - 301 seedlings; 1938 - 50; and 1939 - 14. There are still a few small weak Ribes on the burn which have not been staked.

Table 8 summarizes the data collected from these staked Ribes bushes from 1937 to 1940 inclusive.

Status of Study

Up to the present time the numerous seedling-origin Ribes on the burns studied have been in general of relatively slow growth. This is presumably due to the fact that both burn plots are in timber. A few bushes on each of the plots will fruit in 1941.

These plots are to be checked annually.

TABLE 7

RIBES SURVIVAL AND FRUITING DATA FROM SEVERAL SMALL ECOLOGY PLOTS

Plot Designation	Date of Check	Numbers of Ribes Plants by Estimated Years of Origin, and on Dates as Shown								Total Ribes on Plot
		1940	1939	1938	1937	1936	1935	1934	1933	
Butt Creek #1 (25 milacres)	6/1/39	-	114	325	40	25	14	-	-	519
	7/11/40	192	24	71	33	17	13	-	-	350
	7/11/40 1/	-	-	-	2	5	8	-	-	15
Butt Creek #2 (24 milacres)	5/31/39	-	119	285	28	5	9	8	2	456
	7/12/40	191	54	112	24	3	5	4	1	394
Plot C (21 milacres)	6/9/39	-	957	839	401	72	13	1	-	2,283
	6/22/40 2/	269	106	566	471	93	15	8	-	1,529
	6/22/40 1/	-	-	-	-	1	2	2	-	5
Plot D (4.875 milacres)	6/16/39	-	8	12	4	2	2	1	-	29
	6/21/40	11	-	6	1	2	3	1	-	24
	6/21/40 1/	-	-	-	-	-	1	1	-	3
Plots E and F (24 milacres)	7/25/38	-	-	3,460	2 2/	-	-	-	-	3,462
	6/24/39	-	5,645	805 2/	-	-	-	-	-	6,440
	6/10/40	1,990	938 2/	-	-	-	-	-	-	2,928

1/ Fruiting bushes removed.

2/ Non-fruiting bushes removed.

TABLE 8

SUMMARY OF GROWTH DATA FROM STAKED RIBES BUSHES ON BURNED PORTION OF 5.6-ACRE COW CREEK PLOT (C.F.E.S., MC#12)

Year Staked	Year Bush Origin	Date of Bush Measurement	Number of Ribes Bushes; Size of Bushes (Live Stem) as Shown 0-4"	5-11"	12-35"	36-71"	72-143"	12'-24'	25'+	Plants Dead	Total Plants
1937	1937	8/30/37 1/	50	20	4	-	-	-	-	-	74
		7/2/38	6	29	23	9	1	1	-	5	74
		8/15/39	-	10	32	18	3	4	2	5	74
		9/24/40	1	6	21	23	9	8	1	5	74
1938	1937	7/2/38 1/	50	42	9	-	-	-	-	-	101
		8/15/39	24	34	31	7	1	-	-	4	101
		9/24/40	16	21	31	15	6	1	-	11	101
1939	1937	8/15/39 1/	5	42	36	5	2	-	-	-	90
		9/24/40	5	15	44	13	8	-	-	5	90
	1938	8/15/39 1/	11	20	7	-	-	-	-	-	38
		9/24/40	5	12	17	2	-	1	-	1	38
	1939	8/15/39 1/	1	5	-	-	-	-	-	-	6
		9/24/40	-	-	4	1	-	-	-	1	6
1940	1937	9/24/40 1/	7	17	8	4	-	-	-	-	36
	1938	9/24/40 1/	4	7	1	-	-	-	-	-	12
	1939	9/24/40 1/	3	3	2	-	-	-	-	-	8
Total Staked		8/30/37	50	20	4	-	-	-	-	0	74
		7/2/38	56	71	32	9	1	1	-	5	175
		8/15/39	41	111	106	30	6	4	2	9	309
		9/24/40	41	81	126	60	23	10	1	23	365

1/ Staked on this date.

SQUARE-CHAIN RIBES-IN-BRUSH REGENERATION PLOTS

For previous data on these plots, see annual reports 1936: pp. 280-285; 1938: pp. 118-119; and Serial Report No. 102 (May 18, 1939), pp. 1-17.

In 1936 the writer established, with the assistance of George A. Root, three plots on the Stanislaus National Forest (Strawberry area), and five plots on the Eldorado National Forest (Big Silver area), to study the regeneration of Ribes in dense brush. At the time of first recheck in 1938, instead of inspecting the whole of the sizable plots, three square-chain sample subplots were selected within each of the old plot boundaries. In 1938, nine additional square-chain plots were established on the Stanislaus National Forest (Fahey Meadows area) and six were initiated on the Sierra National Forest (Hogan Mountain area).

All the plots of this series were rechecked in 1940. No Ribes were found this year on 26 of the 37 plots of the series.

Table 9 reports the Ribes data collected from those eleven plots on which Ribes were found.

The extreme difficulty of eradicating Ribes from areas of dense brush is again apparent. It will be observed that two plots on Hogan Mountain, Sierra National Forest, are the only ones on which were found any current season or one-year-old Ribes seedlings, and that in general the Ribes found this year were present on the plots at the time of previous inspections.

A peculiar circumstance was observed on plot Si. 6. In 1938 when the plot was initiated, a very large Ribes nevadense bush (estimated live stem of 4,200 feet) was removed from one corner of the plot. The roots and crown of this bush were growing in rocks and in an old stump, and with the light hand tools used in the extremely dense brush, could not be removed at all conveniently. The plant was eventually decapitated and treated with a heavy dose of dry sodium thiocyanate. The removal of live stem left quite a hole in the brush, and the chemical salt apparently attracted sundry animals which thoroughly disturbed the Ribes crown and the adjacent ground. It should be pointed out that the thiocyanates are not now recommended for field use in connection with the decapitation treatment. Among other reasons, the possible fertilizing action of the decomposition products of the thiocyanates militates against its use. Mixtures of borax and common salt have no such secondary effect.

This year, in the immediate vicinity of this one chemically treated crown, were found 455 small R. nevadense seedlings (9 of 1939 origin, 446 of 1940 origin) and 56 small R. roezli seedlings (all of 1940 origin). The great preponderance of 1940-origin seedlings indicates that, although the Ribes seeds germinated, survival of seedlings was very low. The great majority of the 1939-origin seedlings were small, lacking in vigor, and probably incapable of survival in the brush.

Status of Study

The lack of Ribes regeneration in dense brush seems quite well established. On the basis of these studies, it has previously been suggested

that brush fields should be carefully worked to eliminate as many of the Ribes as possible. Once cleaned, a brush field offers little chance for reestablishment of Ribes. In the future, the plots of this series will be checked at intervals of three to four years, instead of each alternate year as in the past.

ONE-ACRE RIBES REGENERATION PLOTS

For previous material on this unit see annual reports for 1937: pp. 143-145; 1938: pp. 116-117; and 1939: pp. 140, 141, and 154.

This series of one-acre plots now numbers eight. Of these the Pilot Peak, the Signal Peak, and the Shaver Timber plots have been previously described. The five remaining plots will be described herewith.

The Blue Canyon Plot, Sierra National Forest

The Blue Canyon plot was selected and first inspected in July 1939, but was not eradicated at that time. It was eradicated by hand by the methods unit in June 1940. The plot lies in the NW 1/4, NW 1/4, of Sec. 14, T. 10S., R. 25E., on a gentle southerly and southeasterly slope. The principal vegetation is advanced coniferous reproduction, with bear clover (Chamaebatia foliolosa) in the open places, and with occasional clumps of sticky manzanita (Arctostaphylos mariposa). The vigorous tree saplings are mostly 20 - 60 feet high and occasionally occur in thickets. The sugar pine reproduction is excellent both in quantity and in vigor. In places the bear clover is being crowded out by the abundant tree reproduction. On the plot before eradication, were many large bushes and clumps of decadent Ribes roezli with hundreds of feet of dead stem. Some of these big Ribes were dead. The area was logged many years ago, and no serious fire has occurred since. Grazing on the plot is relatively light, there being little palatable herbaceous growth to attract cattle. Because of the advanced coniferous reproduction, and the consequent severe competition for soil moisture, the survival and establishment of Ribes seedlings on this plot is expected to be low.

The Interroad Plot, Big Bar Mountain, Plumas National Forest

The Interroad Plot was first inspected on July 15 - 17, 1940, and soon thereafter was hand eradicated by regular crews from the Big Bar Mountain Camp. The plot lies in the SE 1/4, Sec. 3, T. 22N., R 5E., on a gentle southerly and westerly timbered slope. The west end dips rather sharply into a dry gully. The area was logged about 1936, and was burned in spots larger than would result from careful brush disposal. Considerable logging debris remains on the ground. The general area, however, is in good shape. A fair mixed forest (WF-SP-BO-IC-DF-YP) is left; coniferous reproduction (WF-SP-IC-DF-YP) is good; the broadleafed understory is well developed and vigorous; herbs, with the exception of bracken fern, are not abundant. Ribes roezli and R. nevadense were common on the plot before eradication, but were not particularly abundant. The plot is fairly representative of the openish southerly and westerly slopes in the region.

The Gentle Gully Plot, Big Bar Mountain, Plumas National Forest

The Gentle Gully Plot was first inspected on July 19 - 20, 1940, and later in the summer was hand eradicated by regular crews from the Big Bar Mountain Camp. The plot lies in the NW 1/4, Sec. 2, T. 22N., R 5E., on a gentle to medium northerly slope. A small drainage runs more or less lengthwise through the plot. The area was logged about 1936, but even at that time was not heavily timbered. The predominant vegetation on the plot is medium to high broadleafed mesophytic brush. This mesophytic brush, characteristic of northerly slopes in the region, is not nearly so dense on the plot as it is just to the north towards Mill Creek, where the slope is much steeper and the conditions apparently more humid. Ribes nevadense was abundant, and R. roezli common on the plot before eradication.

The Rock Creek Plot, Plumas National Forest

The Rock Creek Plot was first inspected on August 31, 1939. It was hand eradicated by regular crews in the early summer of 1940, and was rechecked for the first time on July 13, 1940. The plot lies near the U. S. F. S. road south of Deane's Valley in the SW 1/4, SW 1/4, Sec. 5, T. 23N., R 9E. The area is very rocky; the timber (WF-DF-SP-IC) has never been logged, but is only fair. There has been some fire disturbance, and there is considerable reproduction on the plot, especially on the west end. The exposure varies, but is mostly gentle northerly. The soil is shallow. A moist gully crosses the plot near the center. The east end is exceedingly rocky. R. nevadense and R. roezli were common before eradication, but not abundant. Rocky portions of the plot were somewhat grassy, but grazing was light.

The Fanianni Timber Plot, Plumas National Forest

The Fanianni Timber Plot was first inspected on July 23, 1940; it was hand eradicated by the methods unit on July 24; and rechecked on July 25. The plot lies just to the north of the old Humboldt Road in Sec. 12, T. 27N., R 6E. The area is quite rocky; the rock is lava. The unlogged timber (SP-WF-YP-IC) is good, although somewhat overmature. There is considerable advance reproduction on the area. The plot is nearly flat, except that a shallow exceedingly rocky gully crosses it near the northerly end. The soil appears shallow all over the area. The plot is regularly grazed by sheep, and herbaceous vegetation is scarce. Waxberry is heavily browsed.

Table 10 summarizes some of the data collected from the eight Ribes regeneration plots prior to initial eradication. The plots all have an area of one acre and the reported data, therefore, are all on a per acre basis.

Table 11 summarizes the data collected during reinspections of plots of this series during the field season of 1940.

Table 12 records the more important items of ground cover on the several plots. The densities are based on ocular estimates recorded as: + = present but not common, ++ = common but not particularly abundant, and +++ = abundant. Because of slight irregularities in the recording of vegetational data, the results are only approximate, but give a good idea

of the vegetational condition of the plots, and are adequate for rough comparisons.

More detailed data and photographs collected from each plot are on file in the Berkeley office.

Status of Study

Data from this group of plots continue to indicate that few areas remain for long periods within the 25-foot standard of Ribes live stem. The importance of the vigor of Ribes regeneration in relation to the practicability of the rapid establishment of control is well illustrated by comparing the Ribes present on the Pilot Peak and Signal Peak plots after second eradication with those on the Fanianni plot after one eradication. The Pilot Peak and Signal Peak areas represent Ribes regeneration at its most troublesome level.

An interesting observation can be made in respect to time of year of inspection on the Shaver Timber Plot. In the fall of 1939 the record from this plot showed only twelve known Ribes plants with the very small total of seven feet of live stem. In the spring of 1940, an inspection of no greater thoroughness found 38 plants large enough to be mapped (only seven of which were of 1940 origin), and a total of 32 feet of live stem. Small plants obviously lose their leaves in the fall and are extremely difficult to find at that time.

The first two plots established (Pilot Peak and Signal Peak) were on areas considered as "difficult eradication chances" and of rapid Ribes regeneration. The series has now been balanced by plots (Shaver Timber, Rock Creek, Fanianni Timber) on much more favorable areas with respect to eradication chances and with less intense regeneration probability.

TABLE 9

RIBES ERADICATED FROM SQUARE-CHAIN BRUSH PLOTS, 1940

Locality	Plot Designation	Age Distribution of Ribes (Years)							Total Ribes	Size Distribution of Ribes (Live Stem)							Ribes Live Stem on Plot (Estimated Feet)		
		CSS	1	2	3	4	5	6+		0 to 4"	5 to 11"	12 to 35"	36 to 71"	72 to 143"	12' to 24'	25' and Over	Current Season Live Stem	Older Live Stem	Total Live Stem
Hogan Mt., Sierra National Forest	Si. 3	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-	1	2	3
	Si. 4	-	-	-	-	-	-	1	1	-	-	1	-	-	-	-	0	1	1
	Si. 5	13	16	1	-	3	2	11	46	28	2	5	6	2	3	-	37	68	105
	Si. 6	502	9	-	-	-	-	1	512 1/	511	-	-	1	-	-	-	44	3	47
Fahey Meadow, Stanislaus National Forest	St. 2	-	-	-	-	-	-	1	1	-	-	-	-	-	1	-	6	6	12
	St. 4	-	-	-	2	-	1	3	6	-	4	2	-	-	-	-	3	3	6
	St. 7	-	-	-	-	-	-	1	1	-	-	-	1	-	-	-	4	2	6
	St. 9	-	-	-	-	-	-	3	3	-	-	2	1	-	-	-	2	5	7
Strawberry Area Stanislaus National Forest	St. 14	-	-	6	-	-	-	-	6	-	2	4	-	-	-	-	4	2	6
Big Silver Area Eldorado National Forest	El. 1	-	-	1	-	-	-	1	2	-	-	1	-	-	1	-	5 2/	9 2/	14
	El. 13	-	-	-	-	-	-	5	5	-	2	1	-	1	1	-	3	20	23
Totals - - - - -		515	25	8	2	3	3	23	584	539	10	16	10	3	6	-	109	121	230

1/ 455 small seedlings were *Ribes nevadense*, all other Ribes in the Table are *R. roezli*.

2/ Estimated.

TABLE 10

SUMMARY OF PREERADICATION DATA COLLECTED FROM EIGHT ONE-ACRE RIBES REGENERATION PLOTS
(DATA ARE ON A PER ACRE BASIS)

No.	Plot Name	Size Distribution of Recorded Live Bushes (Feet of Live Stem) 0 to 1.9	2 to 5.9	5 to 15.9	16 to 40	41 to 100	101 to 500	Total Bushes (Seedlings Excluded)	Fruit Production Fruiting	Not Fruiting	Total Estimated Live Stem	Ribes Species Distribution Ribes roezli	Ribes nevadense	Ribes viscosissimum	Average Size Bush (Feet Live Stem)	Approximate Relative Abundance Conifers	Date of Initial Check
1	Shaver Timber	36	57	43	40	15	5	196	54	142	4,022	196	-	-	20.5	SP-WF	7/25/39
2	Blue Canyon	215	357	184	124	53	4	937	260	677	11,201	933	4	-	11.9	SP-WF-IC-YP	7/20/39
3	Pilot Peak	235	425	241	102	24	5	1,032	135	897	9,107	1,031	1	-	8.8	YP-WF-IC-SP	7/19/37
4	Signal Peak	107	133	179	185	71	7	682	307	375	13,071	682	-	-	19.2	WF-SP-IC-YP	7/29/37
5	Inter-road	14	29	25	24	17	6	115	36	79	2,992	113	2	-	26.0	WF-SP-IC-DF	7/16/40
6	Gentle Gully	165	245	213	106	43	26	798	143	655	13,935	149	649	-	17.5	WF-DF-IC-SP	7/20/40
7	Rock Creek	75	85	39	23	6	-	228	18	210	1,770	165	62	1	7.8	WF-DF-SP-IC	8/3/39
8	Fanianni Timber	37	33	19	26	16	6	137	55	82	3,214	137	-	-	23.4	SP-WF-YP-IC	7/23/40
Averages		111	171	118	79	31	7	516	126	390	7,414	426	90	-	16.9		
Percentages		21.5	33.1	22.9	15.3	6.0	1.4	100.2	24.4	75.6	-	82.6	17.4	-	-		

TABLE 11

RESULTS FROM RECHECKS MADE ON ONE-ACRE REGENERATION PLOTS DURING 1940
(DATA ARE ALL ON A PER ACRE BASIS)

No.	Plot Name	Date of Re-check	Size Distribution of Plotted Bushes (Live Stem) 0 to 4"	5" to 11"	12" to 35"	36" to 71"	72" to 143"	12' to 24'	25' and Over	Total Bush-es	Species Distribution of Bushes: Ribes roezli	Ribes nevadense	Fruit Production: Fruiting Bushes	Fruits Produced	Small Unplotted Seedlings	Estimated Live Stem: Current Season	One Year and Older	Total Live Stem	Date of Last Eradication
1	Shaver Timber	6/5/40	21	8	6	1	2	-	-	38	38	-	1	14	373	10	22	32	August 1939
2	Blue Canyon 1/	6/10/40	2	16	12	1	-	-	-	31	31	-	-	-	10	7	24	31	June 1940
3	Pilot Peak	5/16/40	24	61	71	33	6	2	-	197	197	-	-	-	64	115	243	358	Summer 1937
3a	Pilot Peak 1/	8/12/40	7	20	23	5	1	2	-	58	58	-	-	-	-	37	75	112	June 1940
4	Signal Peak	6/12/40	21	51	81	23	15	6	1	198	198	-	5	60	288	186	310	496	August 1939
5	Inter-road 1/	8/22/40	2	3	3	1	2	-	-	11	11	-	-	-	5	11	13	24	July 1940
6	Gentle Gully 1/	10/1/40	41	13	24	10	4	1	-	93	46	47	-	-	12	66	65	131	Sept. 1940
7	Rock Creek	7/13/40	15	11	7	1	-	-	-	34	14	20	-	-	22	10e	15e	25	June 1940
8	Fanianni Timber 1/	7/25/40	-	1	3	1	-	-	-	5	5	-	-	-	-	2	8	10	July 1940
	Averages		15	20	26	8	3	1	-	74	66	7	1	8	86	49	86	135	-
	Percentages		20.0	27.7	34.8	11.3	4.5	1.8	0.2	100.3	90.0	10.1	-	-	-	36.4	63.6	100.0	-

e = Not recorded, estimated

1/ First recheck following eradication.

TABLE 12

APPROXIMATE AVERAGE DENSITIES OF MAJOR CONSTITUENTS OF VEGETATION, ETC., ON ONE-ACRE REGENERATION PLOTS

No.	Common Name of Plant Species, etc.,	Botanical Name of Plant Species	Plot Designations: Sierra National Forest				Plumas National Forest			
			Blue Canyon	Shaver Timber	Pilot Peak	Signal Peak	Interroad	Gentle Gully	Rock Creek	Fanianni Timber
1	Mature timber		0.2	1.3	1.1	0.4	1.2	0.5	1.5	1.4
2	Conifer reproduction		1.3	1.6	2.1	1.4	1.5	1.1	1.9	1.7
3	Pole reproduction		1.8	1.1	-	-	-	-	1.0	-
4	Wood debris		1.5	1.4	2.1	1.4	-	-	1.9	1.6
5	Rocks, etc.,		0.2	0.9	-	-	-	-	1.1	2.0
6	Open or herby		1.3	2.0	1.4	1.1	-	-	2.2	0.7
7	Sticky manzanita	Arctostaphylos mariposa	1.0	-	1.4	0.2	-	-	-	-
8	Greene's manzanita	Arctostaphylos patula	0.1	0.2	-	2.1	-	-	-	0.5
9	Chinquapin	Castanopsis sempervirens	-	0.4	-	-	-	-	-	1.2
10	Snowbrush	Ceanothus cordulatus	0.1	0.4	-	1.7	-	-	-	1.7
11	Deerbrush	Ceanothus integerrimus	0.2	-	0.2	-	1.5	1.0	-	-
12	Sweet birch	Ceanothus parvifolius	-	-	-	0.9	-	-	-	-
13	Squawcarpet	Ceanothus prostratus	-	-	-	-	-	-	0.9	1.6
14	Bear clover	Chamaebatia foliolosa	1.4	-	1.8	1.9	-	-	-	-
15	Flowering dogwood	Cornus nuttallii	-	-	-	-	0.8	1.1	0.4	-
16	Hazel brush	Corylus rostrata	-	-	-	-	0.8	2.1	-	-
17	Tanbark oak	Lithocarpus densiflora	-	-	-	-	0.9	0.9	-	-
18	Bitter cherry	Prunus emarginata	-	-	-	0.3	0.1	-	-	0.6
19	Bracken fern	Pteris aquilina	-	-	0.7	-	1.9	1.3	-	-
20	Black oak	Quercus kelloggii	-	-	0.7	-	1.4	0.8	-	-
21	Wood rose	Rosa gymnocarpa?	-	-	-	-	0.5	0.7	-	-
22	Ground rose	Rosa spithamea	-	-	0.4	0.9	-	-	-	-
23	Thimbleberry	Rubus parviflorus	-	-	-	-	0.2	1.8	-	-
24	Ground waxberry	Symphoricarpos mollis	-	-	-	0.7	0.3	0.2	-	1.5

(- dash) = Absent, present in no considerable quantities, or not recorded.

RIBES REGENERATION IN GRAZING EXCLOSURES

A new series of plots, from which grazing animals are excluded by strong barbed-wire fences, was initiated in 1940. A study of the effects of grazing, particularly over-grazing, on the ecology of Ribes in the Sugar Pine Region had been projected a number of times in the past. The incentive to the rapid establishment of the present series of exclosures was provided by the initiation of similar studies in the Northwestern Region during the fall of 1939. In the Sugar Pine Region the purpose of these grazing exclosures is to study the interaction of grazing and the growth and regeneration of pine and Ribes following eradication of Ribes by grubbing and by oiling. Lawrence P. Winslow cooperated in the establishment of the grazing plots.

Four sets of plots were initiated in selected areas of heavy grazing. The exclosures included isolation strips within the fences and four subplots, each a quarter of a square chain in area (1/2 x 1/2 chain). The same number and size of control subplots were established in the immediate vicinity outside the fence. Two subplots within and two without the fence were eradicated with the usual hand tools. A like number of subplots were eradicated by decapitation and treatment with Diesel oil. Comparisons will be made, as the study progresses, of Ribes seedling occurrence, establishment, survival, and growth between hand and oil eradication. Data on these items will be compared also on grazed and ungrazed subplots.

Brief descriptions of the four areas in which the plots were established are given herewith.

Chowchilla Mountain Exclosure, Sierra National Forest

The Chowchilla Mountain exclosure was established along the Bear Wallow road about a mile north of the old camp site of BRC #2 in the NE 1/4, Sec. 34, T. 4S., R. 20E. This exclosure was built during the middle of September 1940. The area was logged about 1927, and was badly disturbed in the process. A logging railroad spur, with its attendant disturbance of cut and fill, crosses one side of the exclosure. The area lies on a gentle northwesterly slope to the east of a moist northerly-draining lupine swale. A considerable portion of the area is open ground; there is little or no duff. The section was eradicated by hand in the fall of 1935 and in August 1938 with Diesel oil (selective bush treatments with minimum amounts of oil). In 1940 bushes of Ribes roezli on the area were numerous and of good vigor. A considerable number of fruiting bushes was found on the area in 1940. The forest is a very thin residual stand of SP-WF-IC-YP. The SP reproduction is excellent. The area is very heavily grazed by cattle and deer; some clumps of manzanita have been repeatedly and closely browsed into small very brushy clumps. The soil is loose, deep and sandy.

Cow Creek Exclosure, Stanislaus National Forest

The Cow Creek exclosure was built early in September 1940 and is located just south of the U.S.F.S. road about a quarter of a mile west of the Cow Creek BRC Camp site in the NE 1/4, Sec. 34, T. 5N., R. 18E., on a

part of the site of a Pickering logging camp used about 1926-1928. The logging job was careless; but there has been no apparent post-logging burn. The area is now open residual timber (WF-RF-SP-YP) with considerable fir reproduction and brush - mostly snowbrush - and considerable wood debris on the ground. The area is practically flat. It was partially eradicated of Ribes by experimental chemical methods in 1931, by hand in 1933, and again by hand in 1936. Considerable numbers of fruiting bushes were removed from the several subplots in 1940. Ribes regeneration has been abundant and very vigorous on this area for many years, and still continues. The area is heavily grazed by cattle, and occasionally by horses. The soil is light-colored, loose, deep, and friable.

Big Bar Mountain Exclosure, Plumas National Forest

The Big Bar Mountain exclosure was established during the latter part of August 1940, very near the center of Sec. 3, T. 22N., R. 5E., on the flat open top of an east-west ridge. The region was logged about 1936, and the immediate area had been burned some years before the logging operation. As a result the ridge is quite bare; the SP and YP trees have been cut, and the abundant black oaks have been killed by fire. There is some mixed coniferous reproduction on the area. The main brush species are deerbrush and Ribes roezli; the main herbs are bracken fern and Whitneya dealbata. The area is regularly grazed by cattle. No Ribes eradication work had been performed on the area when the plot was initiated. The soil is shallow, light-colored, fairly friable near the surface, and somewhat rocky.

Lake Almanor Exclosure, Plumas National Forest

The Lake Almanor exclosure was established the latter part of August 1940 on nearly flat ground, in the SW 1/4, Sec. 17, T. 27N., R. 8E. The area was logged several years before initiation of the plot, and had been lightly burned as well. Few conifers remain on the immediate area. The residual forest of the general area is of WF-DF-IC-SP-YP. The conifer reproduction is mostly incense cedar. The main brush species is snowbrush. The plot is grazed heavily by sheep, and no appreciable herb growth, other than bracken fern, was apparent at the time of initiation. The soil is red and clayey, and tightly compacted below the thin duff.

Table 13 summarizes data on the Ribes and coniferous reproduction found on the plots and subplots at time of initiation.

Table 14 summarizes the extent to which several of the more important plants on each of the four areas had been grazed at the time of plot initiation. These data will serve as bases for comparisons as the study progresses.

More detailed data and photographs taken on the four sets of plots are on file in the Berkeley office.

Status of Study

This series of plots was initiated in 1940. They will be checked annually.

TABLE 13 - RIBES, AND CONIFEROUS REPRODUCTION, ON

Eradi-cation Method	Side of Fence	Sub-plots	Area of Sub-plots Acres	Size Distribution of Ribes Bushes (Feet of Live Stem) 0 to 1.9	2 to 5.9	6 to 15.9	16 to 40	41 to 100	101 to 500	501 and Over	Total Ribes Bushes
Chowchilla Mountain											
Hand	In	2	1/20	342	152	50	6	1	1	-	552
Hand	Out	2	1/20	275	92	29	11	1	2	-	410
Oil	In	2	1/20	114	77	63	22	5	-	-	281
Oil	Out	2	1/20	199	86	34	6	2	-	-	327
Hand	Total	4	1/10	617	244	79	17	2	3	-	962
Oil	Total	4	1/10	313	163	97	28	7	-	-	608
Total	In	4	1/10	456	229	113	28	6	1	-	833
Total	Out	4	1/10	474	178	63	17	3	2	-	737
Plot Total - -		8	1/5	930	407	176	45	9	3	-	1,570
Cow Creek											
Hand	In	2	1/20	399	214	143	39	6	-	-	801
Hand	Out	2	1/20	384	212	79	9	-	-	-	684
Oil	In	2	1/20	159	137	73	19	-	-	-	388
Oil	Out	2	1/20	100	134	83	27	1	-	-	345
Hand	Total	4	1/10	783	426	222	48	6	-	-	1,485
Oil	Total	4	1/10	259	271	156	46	1	-	-	733
Total	In	4	1/10	558	351	216	58	6	-	-	1,189
Total	Out	4	1/10	484	346	162	36	1	-	-	1,029
Plot Total - -		8	1/5	1,042	697	378	94	7	-	-	2,218
Big Bar Mountain											
Hand	In	2	1/20	2	19	22	12	10	6	-	71
Hand	Out	2	1/20	-	2	10	10	5	5	-	32
Oil	In	2	1/20	13	10	10	10	6	4	2	55
Oil	Out	2	1/20	8	6	5	9	4	18	-	50
Hand	Total	4	1/10	2	21	32	22	15	11	-	103
Oil	Total	4	1/10	21	16	15	19	10	22	2	105
Total	In	4	1/10	15	29	32	22	16	10	2	126
Total	Out	4	1/10	8	8	15	19	9	23	-	82
Plot Total - -		8	1/5	23	37	47	41	25	33	2	208
Lake Almanor											
Hand	In	2	1/20	15	31	47	38	16	12	-	159
Hand	Out	3	1/20	25	20	36	23	20	9	-	133
Oil	In	2	1/20	5	4	28	24	26	3	-	90
Oil	Out	2	1/20	4	12	11	14	9	5	-	55
Hand	Total	5	1/10	40	51	83	61	36	21	-	292
Oil	Total	4	1/10	9	16	39	38	35	8	-	145
Total	In	4	1/10	20	35	75	62	42	15	-	249
Total	Out	5	1/10	29	32	47	37	29	14	-	188
Plot Total - -		9	1/5	49	67	122	99	71	29	-	437

EXCLOSURE PLOTS AT TIME OF INITIATION

Small Additional Seedlings	Total Estimated Ribes Live Stem (Feet)	Size Distribution of Coniferous Reproduction (Height in Feet) 0 to 1.75	2 to 3.5	4 to 6.5	7 to 10.5	11 to 20	Total Conifer Reproduction	Species Distribution of Coniferous Reproduction SP	YP	DF	IC	WF
					Chowchilla Mountain							
164	1,425	26	2	1	-	-	29	3	11	-	14	1
192	1,284	9	1	-	1	-	11	5	2	-	4	-
20	1,791	23	1	-	1	-	25	10	4	-	10	1
166	982	3	-	-	2	-	5	3	1	-	1	-
356	2,709	35	3	1	1	-	40	8	13	-	18	1
186	2,773	26	1	-	3	-	30	13	5	-	11	1
184	3,216	49	3	1	1	-	54	13	15	-	24	2
358	2,266	12	1	-	3	-	16	8	3	-	5	-
542	5,482	61	4	1	4	-	70	21	18	-	29	2
					Cow Creek							
-	3,585	5	1	-	-	-	6	-	5	-	-	1
-	1,956	7	7	7	6	-	27	-	6	-	-	21
-	1,558	3	-	-	-	-	3	-	3	-	-	-
-	1,811	-	2	2	1	1	6	-	-	-	-	6
-	5,541	12	8	7	6	-	33	-	11	-	-	22
-	3,369	3	2	2	1	1	9	-	3	-	-	6
-	5,143	8	1	-	-	-	9	-	8	-	-	1
-	3,767	7	9	9	7	1	33	-	6	-	-	27
-	8,910	15	10	9	7	1	42	-	14	-	-	28
					Big Bar Mountain							
-	2,679	2	6	7	2	1	18	-	9	-	7	2
-	1,661	20	1	6	1	1	29	2	1	-	7	19
-	3,462	6	11	5	7	1	30	16	3	-	-	11
-	5,437	27	6	2	-	-	35	1	2	-	1	31
-	4,340	22	7	13	3	2	47	2	10	-	14	21
-	8,899	33	17	7	7	1	65	17	5	-	1	42
-	6,141	8	17	12	9	2	48	16	12	-	7	13
-	7,098	47	7	8	1	1	64	3	3	-	8	50
-	13,239	55	24	20	10	3	112	19	15	-	15	63
					Lake Almanor							
-	5,814	89	32	12	-	-	133	-	-	-	132	1
3	4,145	11	19	5	-	-	35	-	-	-	35	-
-	3,664	100	42	6	2	-	150	-	1	2	146	1
-	2,029	105	15	5	-	-	125	-	-	1	124	-
3	9,959	100	51	17	-	-	168	-	-	-	167	1
-	5,693	205	57	11	2	-	275	-	1	3	270	1
-	9,478	189	74	18	2	-	283	-	1	2	278	2
3	6,174	116	34	10	-	-	160	-	-	1	159	-
3	15,652	305	108	28	2	-	443	-	1	3	437	2

TABLE 14

GRAZING DAMAGE TO PLANTS PRIOR TO FENCING OF EXCLOSURES

Botanical Names of Plants	Common Names of Plants	Degree of Grazing of Plants on Exclosures			
		Chowchilla Mountain	Cow Creek	Big Bar Mountain	Lake Almanor
	Coniferous reproduction	lightly [1]	Not grazed	Not grazed	Not grazed
	Grasses	Heavily	-	-	Heavily
Arctostaphylos patula	Greene's manzanita	Heavily	Moderately	Not grazed	Moderately
Arctostaphylos viscida	Sticky manzanita	-	-	Moderately	-
Ceanothus cordulatus	Snowbrush	Moderately	Moderately	-	Moderately
Ceanothus integerrimus	Deerbrush	-	-	Heavily	-
Ceanothus prostratus	Squaw carpet	-	-	-	Moderately
Cirsium sps.	Thistles	-	Not grazed	-	-
Iris hartwegii	Sierra iris	-	-	Heavily	-
Kelloggia galioides	Kelloggia	Heavily	-	-	-
Lupinus sps.	Lupines	-	-	Heavily	-
Osmorrhiza nuda	Sweet cicely	-	-	Moderately	-
Phacelia sps.	Phacelia	Moderately	-	-	-
Potentilla sps.	Potentilla	-	-	Heavily	-
Prunus emarginata	Bitter cherry	-	Heavily	-	Heavily
Pteris aquilina	Bracken fern	-	-	Not grazed	Heavily
Quercus kelloggii	Black oak	-	-	Moderately	-
Ribes nevadense	Sierra currant	-	-	Heavily	-
Ribes roezli	Sierra gooseberry	Moderately	Moderately	-	Moderately
Rosa gymnocarpa	Wood rose	-	-	-	Heavily
Rosa spithamea	Ground rose	Heavily	Moderately	-	-
Rubus parviflorus	Thimbleberry	-	-	Heavily	-
Rumex acetosella	Sheep sorrel	Heavily	-	-	-
Salix scouleriana	Nuttall willow	-	Heavily	-	-
Sambucus glauca	Blue elderberry	Heavily	Heavily	-	-
Symphoricarpos mollis	Ground waxberry	Heavily	Heavily	Heavily	Heavily
Whitneya dealbata	Whitneya	-	-	Moderately	-

(– dash) = Not recorded from plot concerned.

[1] Small SP reproduction somewhat browsed; WF, IC, and YP reproduction not browsed.

EXPERIMENTS ON THE CROSS- AND SELF-POLLINATION OF RIBES

Discussions in the Regional Leaders' meeting held at Washington, D.C., in January 1940, and talks in the Spokane office soon thereafter, raised the following questions: (1) Is it possible to eliminate Ribes from certain forested areas? (2) Do Ribes set fruits as a result of cross- or self-pollination? (3) What is the comparative viability of seeds produced by cross-pollination and (or) self-pollination?

A number of plants are self-sterile, that is, pollen from a plant will not fertilize stigmas on the same plant, but will readily fertilize stigmas of other plants of the same population (Proc. Amer. Phil. Soc. 82 (1940) 4: 449-518. Bot. Rev. 4 (1938) 6: 275-369). Self-sterility in Ribes, or the failure of isolated Ribes to produce fruit, should have practical significance in the planning of maintenance work. During 1940, a number of pollination tests were performed in the Ribes Garden at Berkeley (Univ. Calif. Bot. Gard.), in the field in California, and in the field in Idaho.

Table 15 and 15a summarizes the results of these cross- and self-pollinations.

Due to factors of stormy weather, plant disease in the Ribes Garden, rodent and grazing damage in the field, and to the possibility of contamination in self-pollinated flowers, the writer believes that the production of a single mature fruit in the self-pollinated group is non-significant. For the species with clear-cut data (Ribes roezli, R. nevadense, R. glutinosum, and R. viscosissimum), data in Table 15 show that there is no significant amount of self-pollination in Ribes. Therefore, in control areas, as Ribes plants become widely spaced because of effective eradication, it is expected that there will be produced progressively fewer seeds per plant. When plants on an area become so few that insects, especially bees, will not pass from one bush to the other, presumably no seeds will be produced. Rodent pressure by the consumption of the smaller quantities of seeds, may make seed production ineffective somewhat in advance of the time when it is curtailed by self-sterility.

The seed samples produced by the experimental pollinations, together with open-pollinated controls, have been placed in germination tests which are not yet complete. Germination results will be reported at a later date.

Status of Study

Investigations so far completed show that Ribes set fruits only when they are cross-pollinated. This conclusion stresses the importance of the distribution pattern of Ribes on areas designated as in control status. Control standards should be examined in the light of number, distribution and general regenerative vigor of the Ribes involved.

Addition field tests on this problem are projected for 1941.

TABLE 15

RESULTS OF RIBES CROSS-POLLINATION EXPERIMENTS, 1940

Locality	Bush Number	Ribes Species	Inflores-cences	Flowers Emasculated	Dropped Promptly	Fruits Set	Fruits Matured	Seeds Collected	Seeds Per Fruit
Ribes Garden	177E	R.glutinosum	4	42	33	9	7	241	34
	177W	do.	4	22	7	15	14	553	40
	110S	do.	4	20	10	10	9	216	24
	047M 1/	R.gracillimum	4	-	Most	-	0	0	-
	047E 1/	do.	4	-	Most	-	0	0	-
	121W 1/	do.	4	-	Most	-	0	0	-
	525	R.roezli	4	-	-	8	8	426	53
	174 1/	do.	4	-	-	3	2	70	35
Sierra National Forest	-	R.roezli (1)	25	144	79	65 2/	35 2/	1,737 2/	50 2/
	-	R.nevadense (2)	16	80	41	39	32	725	23
Idaho	Deer Creek	R. viscosissimum	12 (3)	52	31	21 2/	13 2/	376 2/	29 2/
	Powder House	do. (4)	2	12	12	0	0	0	-
	Head-quarters	R.lacustre	12	-	All	0	0	0	-
	Totals - - - - - - - - - -		99	-	-	-	120	4,344	-

1/ Plant badly diseased.

2/ Some loss to rodents.

(- dash) = Data not recorded.

Explanation of figures in parentheses: (1) eleven bushes; (2) four bushes; (3) six bushes; and (4) two bushes.

TABLE 15A

RESULTS OF RIBES SELF-POLLINATION EXPERIMENTS, 1940

Locality	Bush Number	Ribes Species	Inflorescences	Flowers Emasculated	Dropped Promptly	Fruits Set	Fruits Matured	Seeds Collected	Cross-Pollination Parent
Ribes Garden	177E	R.glutinosum	4	-	All	0	0	0	177W
	177W	do.	4	-	All	0	0	0	177E
	110S	do.	4	-	All	0	0	0	177W
	047M 1/	R.gracillimum	4	-	Most	-	0	0	047E
	047E 1/	do.	4	-	Most	-	0	0	047M
	121W 1/	do.	4	-	Most	-	0	0	047E
	525	R.roezli	4	-	-	1	1	42	174
	174 1/	do.	4	-	-	0	0	0	525
Sierra National Forest	-	R.roezli (1)	25	160	159	1	0	0	Several
	-	R.nevadense (2)	16	83	68	15	0	0	Several
Idaho	Deer Creek	R. viscosissimum	18 (3)	83	82	1	0	0	Three
	Powder House	do. (4)	12	52	All	0	0	0	#48
	Head-quarters	R.lacustre	0	0	-	-	-	-	Same
	Totals - - - - - - - - - -		103	-	-	-	1	42	-

1/ Plant badly diseased.
(- dash) = Data not recorded.
Explanation of figures in parentheses: (1) eleven bushes; (2) four bushes; (3) five bushes; and (4) two bushes.